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WOOD®

THE #1 MAGAZINE FOR HOME WOODWORKERS

DECEMBER 1990 • ISSUE NO. 39
Display until December 18

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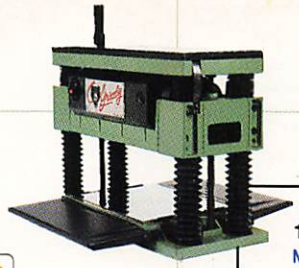

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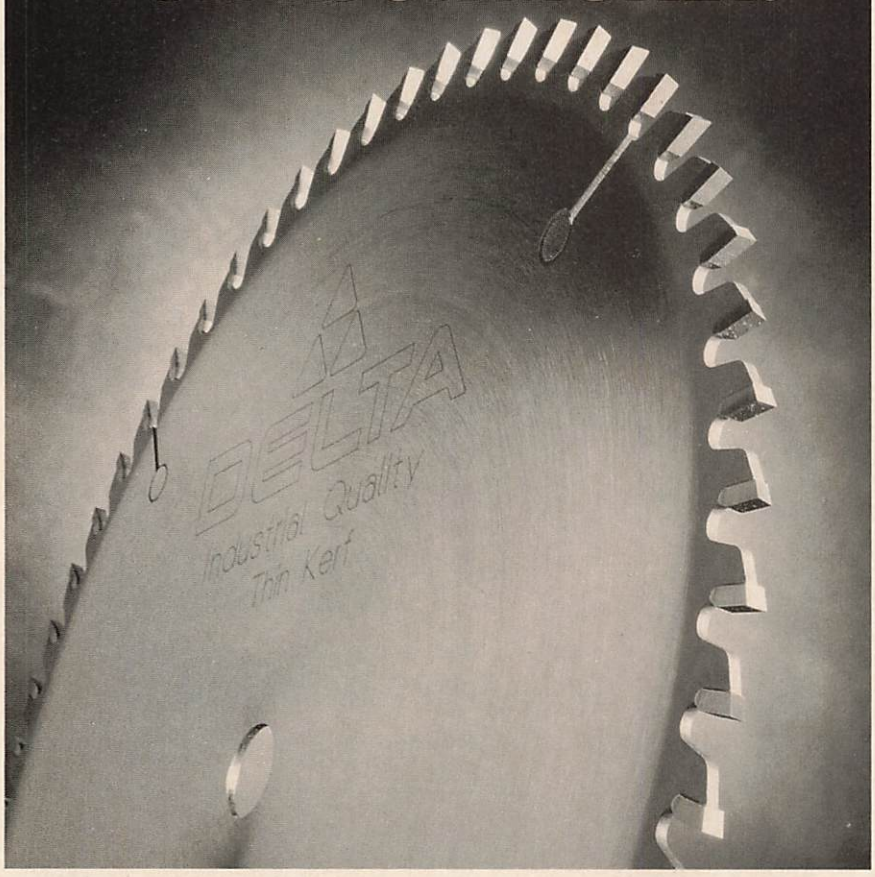

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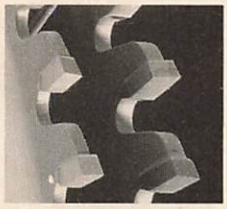

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December 1990 • Vol. 7, No. 7 • Issue No. 39

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New!

- *Dial any speed from 400 to 1800 cuts/min !*
- *Saws with similar features sell for over $700*
- *Special introductory price...*

only **$189.95**

(item **#SVS**, UPS $10)

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This new model features a powerful, high quality **electronically controlled universal motor that gives full power and torque at all speeds**. Similar in design to our Super-15" model, the cutting action has been re-engineered to give smoother cutting and performance equal to saws many times the price.

Dial any speed from 400 - 1800 cuts/min to set the speed specifically for the job at hand. Use slower speeds for cutting plastics, metals and hardwoods.

FREE ACCESSORIES:

• **Dust blower** • 1 dz blades • EZ-Set permanent top-arm blade holder • 4 Standard blade holders.• EZ Jig for attaching standard blade holders • Neptune 1-1/2" lettering guides w/6 patterns

Specifications:

- Motor: Universal motor w/electronic speed control. 110V, 1.3Amp, sealed ball bearings
- Speeds: 400 -1800 cuts/min
- Throat : 15" deep • Stroke - 3/4"
- Tilt : 0 - 45º left • Cut Depth: 2"
- Blades: accepts pin and plainend
- Construction - cast iron

Scroll Saw Products

Super 15" Scroll Saw

Our most popular model. Same specs as Super V-15 model with single speed 1650 cpm motor, dust blower optional. Same free accessories as listed above.
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- 6" Faceplate • 8 pc wood turning chisel set

SPECIFICATIONS:

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- 3 Speeds: 660, 1500, 2850 RPM
- Headstock thread - 3/4" x 10 tpi
- Overall length: 60" - Weight : 100lbs

Item **# L40** .....*On Sale* **$249.95** (UPS $20)

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Heavy duty. Wt. 25Lbs
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Extra Set of 2 Knives

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Item #PKN .....$25.00/set (•)

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- Belt table tilts/locks to horiz & vert positions
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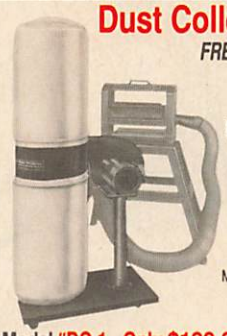

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Specifications:	DC-1	DC-2
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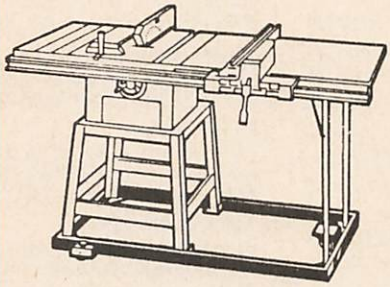

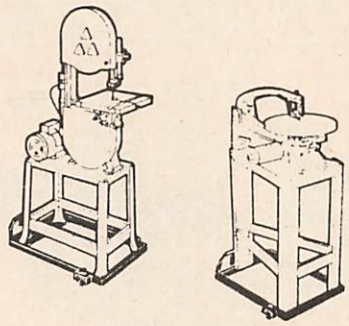

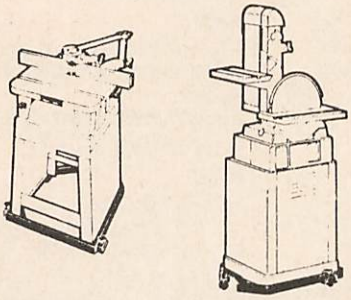

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This issue's cover wood grain: White Pine — *Cover photo: John Hetherington*

DECEMBER 1990 — ISSUE NO. 39

WOOD PROFILE

Yellow birch: The shimmering queen of the north 33

Long ago, craftsmen discovered birch's strength. This golden-colored wood remains a standard for today's chairs, tables, and cabinets.

HOLIDAY HIGHLIGHTS

Return to the Round Table 36

Come take a closer look at our versatile block castle designed for your little prince or princess.

Taking care of business 40

Make a lasting impression with a wooden business-card holder.

Jewel of a case 42

Distinctive joinery and sensible trays highlight a reader's jewelry box.

A cut above the rest 46

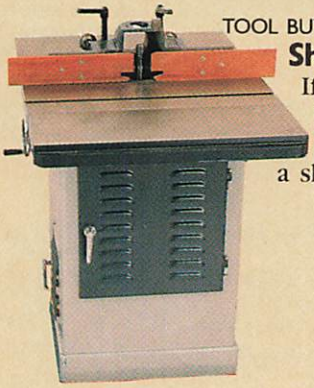
Expect years of service from our patterned end-grain cutting board.

Snow-loving open sleigh 48

Bent runners frighten you? No problem here: A laminating jig simplifies forming runners for this classic sleigh designed in Minnesota.

The three rack-a-tiers 54

Help someone organize video, cassette, and compact-disc collections.



TOOL BUYMANSHIP

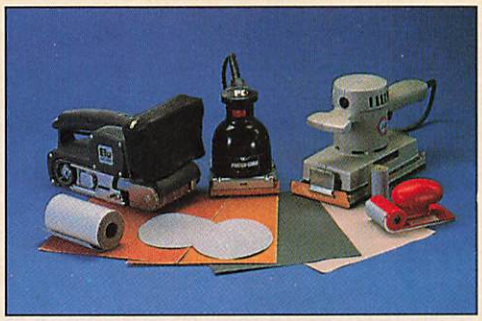
Shapers 56

If you constantly test your router table with big projects, a shaper could make sense for your workshop. Find out how much muscle a shaper can deliver.

SHOP-TESTED TECHNIQUES

Sanding shortcuts 62

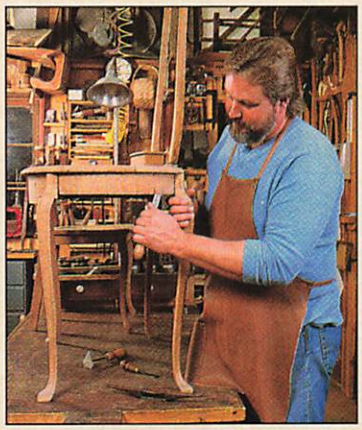
After you learn how to choose the best abrasive, review the strong points of 13 sanding devices. Then, check out our list of hints.



CRAFTSMAN CLOSE-UP

Good wood is worth restorin' 68

Sit in on a visit with Jim Watson and discover how he restores tired furniture. Be sure to save Jim's tips for a successful refinishing project.



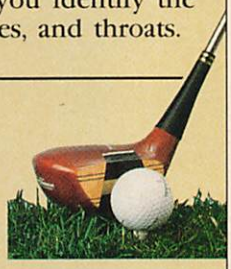
THE ENVIRONMENT

Battling harmful vapors 72

Don't miss this important health article. It will help you identify the culprits in strippers and finishes that irritate eyes, noses, and throats.

Good sports 74

Features editor Pete Stephano tees up with a foursome of sports diversions steeped with a long-standing partnership with wood.



CARVING PATTERN

Carve a Santa 78

Ring in the holiday season with a new carving project of Santa carrying a Christmas goose.

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Over 400 WOOD PARTS

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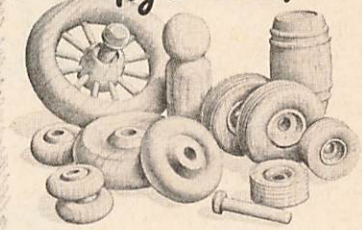
Toy Builders!



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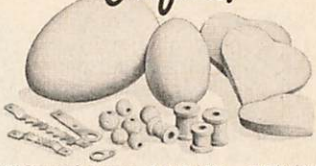
1-1/2" Truck Tire	$ 2.40 / 8	$14.00 / 100
1-5/8" Pickel Barrel	$ 3.00 / 12	$18.00 / 100

Crafters!



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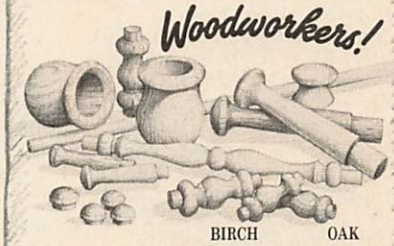
4-1/4" Goose Egg	$ 3.00 / EA	$30.00 / 12

Woodworkers!



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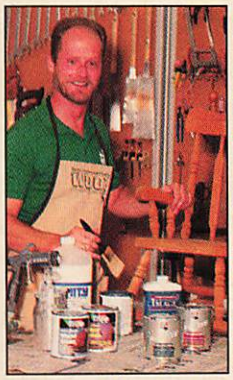
THE EDITOR'S ANGLE

READY OR NOT, HERE THEY COME...
WATER-BASED FINISHES

Until fairly recently, solvent-based finishes were the only game in town for home woodworkers. But now, thanks largely to California standards that limit the content of volatile organic compounds (VOC), finish manufacturers everywhere are scrambling to reformulate their products. And guess what? Several companies now have water-based products on the market that perform quite well. That's why we plan to make use of these environment-friendly products whenever practical here in the *WOOD* magazine shop. And we hope that you will consider doing the same in yours.



Jim Boelling, our project builder, ran product tests, too.

Like most other woodworkers, we've always sensed the danger in using solvent-based finishes, but we weren't sure there were any viable alternatives. That's why we asked representatives from Basic Coatings and Amity Products, two innovators in the finishing field, to come to our shop and give us demonstrations. The results they showed us were impressive, but we wanted some expert outside advice, too.

Enter Wade Sundeen, a Des Moines-area finishing professional and self-styled "finishing fanatic." Wade, who has long been concerned about the effects of solvents on his health and that of other finishing professionals, agreed to put several different company's products to the test. After spraying and hand-applying both lacquer and polyurethane, he came back impressed—especially by the quick drying times of some of the polyurethanes, and the lack of smelly vapors.

THE ENVIRONMENT IT'S ALL WE HAVE

We'll be giving you a full report on our testing results in the April 1991 issue.

BUILD 'A-TOY

HAVE YOU ENTERED THE 1991 CONTEST YET?

If not, there's still time to do a good turn—and possibly win a nice prize. See page 78 of the October issue for how to enter our 1991 Build-A-Toy competition. By the way, if you happen to be in New York City between now and New Year's Day, be sure to stop by the Museum of American Folk Art and see the 1989 and 1990 winning toys on display there. I think you'll be impressed.

Larry Clayton

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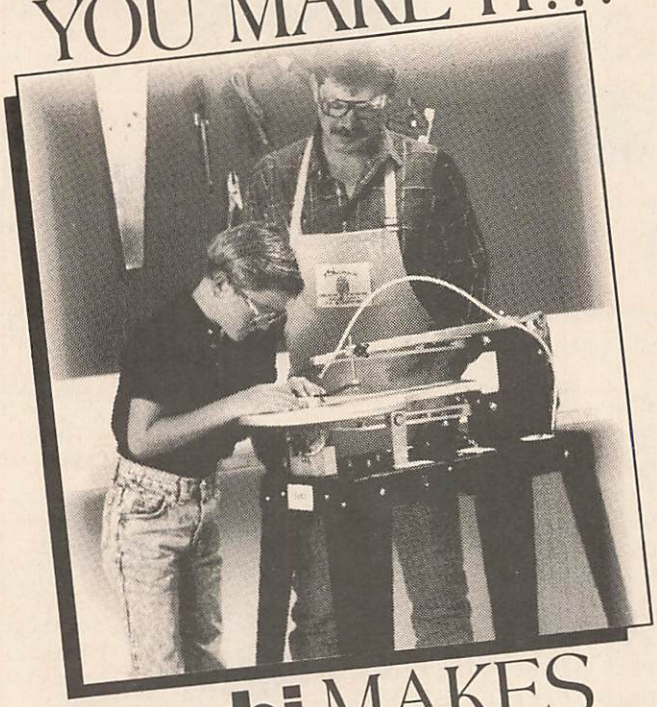

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TALKING BACK

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Letters Editor, *WOOD*® Magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

Forest update

THE ENVIRONMENT IT'S ALL WE HAVE

Thank you for an informative article titled "Fight in the Forest" in the August 1990 issue. It points out that both loggers and environmentalists are having a tough time seeing the forest through the trees.

Obviously, there are no easy answers, but if cutbacks, job retraining, and changes in Japanese log exports are inevitable, better they come now before the last stick of timber is gone.

Jobs are tremendously important, but anyone who can't see the genetic and esthetic value in saving old-growth timber has never walked through the forest without a chainsaw.

Bob Hammill, Davenport, Iowa

I am bothered by the amount of space devoted to editorial posturing in Issue 36, August 1990. I subscribe to *WOOD* magazine for advice, suggestions, and ideas in woodworking, not politics or ecology!

"Fight in the Forest" contained nothing I have not read elsewhere. But other publications do not provide what I need or desire in woodworking articles and information. So far as I am concerned, you have used five pages of my subscription to make a political or ecological statement.

—Edward Vitello, Georgetown, Mass.

If I choose to build an item from a fine or rare wood, I am willing to pay the extra price that conservation would imply. The beauty of a polished cherry cabinet must be weighed against the beauty of a blossoming tree. I'm sure that many readers of your magazine, like me, are not commercial producers of wood products, concerned only with a profit. Instead, they are hobbyists who respect the environment and try to live in harmony with it.

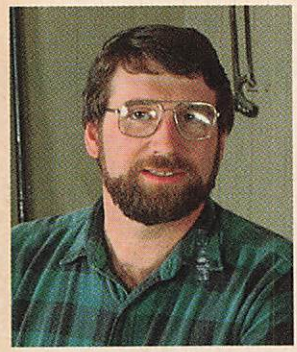
—Joseph T. Lowe, Dallas, Texas

Thanks to all three readers for their letters. We appreciate the input. Regarding ecological articles in WOOD *magazine, our policy is to report on issues of concern to woodworkers and woodworking as well as their possible effects. We will continue to focus our articles on woodworking projects, tools, techniques, and related articles, but we can't bury our collective heads in the sawdust. By our count, we've devoted less than 3 percent of our editorial space in the last year to environmental pieces.*

Continued on page 13

All New! MORE NORM!

An all-new collection of projects from Norm Abram and the NEW YANKEE WORKSHOP.



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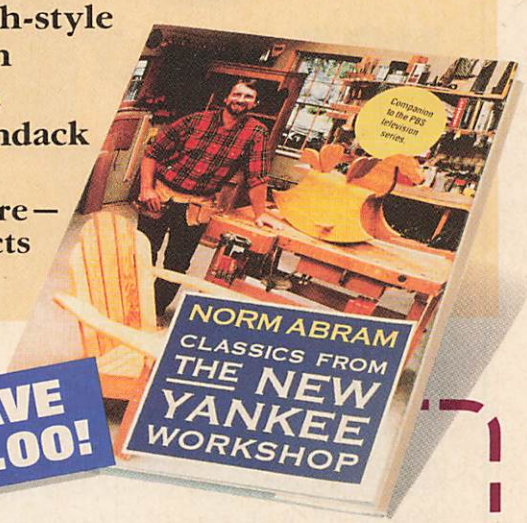

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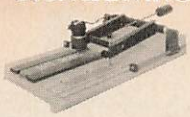

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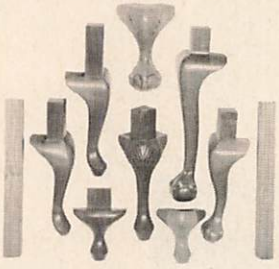

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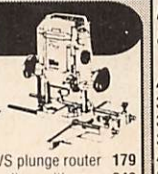
R500	2-1/4 hp plunge router	148
BE321	3x21 VS belt sander	128
JM100K	*NEW!* plate jointer	229

Elu



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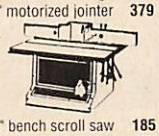

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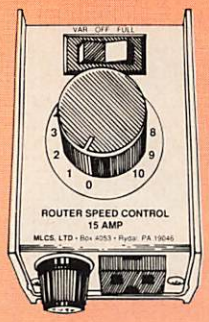

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ITEM NO.	BEST CUT BEST PRICE	DESCRIPTION	ANGLE/DEPTH/RADIUS CIRCLE DIAMETER	LARGE DIA.	CUTTING LENGTH	SHANK SIZE	PRICE
#601	Solid Carbide	1/8" **Spiral Cutter**	*Proper Adaptor Will Be Supplied	1/8"	1/2"	1/4" *	$ 9.00
#602		3/16" Spiral Cutter		3/16"	5/8"	1/4" *	$12.00
#603		1/4" Spiral Cutter		1/4"	3/4"	1/4"	$12.00
#903		1/4" Spiral Cutter		1/4"	3/4"	1/2" *	$12.00
#904		3/8" Spiral Cutter		3/8"	1"	1/2" *	$24.00
#905		1/2" Spiral Cutter		1/2"	1 1/2"	1/2"	$29.00
#350		1/8" **Round Over**	1/8" R	3/4"	3/8"	1/4"	$11.00
#351		3/16" Round Over	3/16" R	7/8"	1/2"	1/4"	$11.00
#230		1/4" Round Over	1/4" R	1"	1/2"	1/4"	$12.00
#353		5/16" Round Over	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#209		3/8" Round Over	3/8" R	1 1/4"	5/8"	1/4"	$15.00
#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	$21.00
#199		**Multiform Moulding**	Unlimited Patterns	2 1/4"	2"	1/2"	$40.00
#340		1/8" **Cove**	1/8" R	5/8"	3/8"	1/4"	$12.00
#205		1/4" Cove	1/4" R	1"	1/2"	1/4"	$12.00
#206		3/8" Cove	3/8" R	1 1/4"	9/16"	1/4"	$13.00
#207		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	$14.00
#208		3/4" Cove	3/4" R	1 7/8"	3/4"	1/2"	$26.00
#460		1/4" **Bull Nose**	1/4" Dia. of Circle		3/8"	1/4"	$14.00
#461		3/8" Bull Nose	3/8" Dia. of Circle		3/4"	1/4"	$15.00
#462		1/2" Bull Nose	1/2" Dia. of Circle		7/8"	1/4"	$16.00
#464		3/4" Bull Nose	3/4" Dia. of Circle		1 1/8"	1/4"	$19.00
#506		1/2" **Pattern**	Flush Trim	1/2"	1"	1/4"	$15.00
#507		5/8" Pattern	Flush Trim	5/8"	1"	1/4"	$16.00
#508		3/4" Pattern	Flush Trim	3/4"	1"	1/4"	$17.00
#366		1/8" **Slot Cutter**	3/8" Deep	1 1/4"	1/8"	1/4"	$14.00
#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	$14.00
#204		3/8" Rabbeting	3/8" Deep	1 1/4"	1/2"	1/4"	$13.00

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#210		1/4" **Core Box**	round nose	1/4"	1/4"	1/4"	$ 9.00
#211		3/8" Core Box	round nose	3/8"	3/8"	1/4"	$10.00
#212		1/2" Core Box	round nose	1/2"	11/32"	1/4"	$13.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	$15.00
#213		1" Core Box	round nose	1"	3/4"	1/2"	$17.00
#214		1/4" **Straight**	plunge cutting	1/4"	3/4"	1/4"	$ 6.50
#215		5/16" Straight	plunge cutting	5/16"	1"	1/4"	$ 6.50
#216		3/8" Straight	plunge cutting	3/8"	1"	1/4"	$ 6.50
#217		7/16" Straight	plunge cutting	7/16"	1"	1/4"	$ 6.50
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	$ 7.00
#775		1/2" Straight	plunge cutting	1/2"	2"	1/2"	$14.00
#218		5/8" Straight	plunge cutting	5/8"	1"	1/4"	$ 7.00
#219		3/4" Straight	plunge cutting	3/4"	1"	1/4"	$ 9.50
#220		1" Straight	plunge cutting	1"	1 1/2"	1/2"	$11.00
#500		3/8" **Flush**	**Trimming**	3/8"	1/2"	1/4"	$ 7.00
#502		1/2" Flush	Trimming	1/2"	1/2"	1/4"	$ 7.50
#503		1/2" Flush	Trimming	1/2"	1"	1/4"	$ 8.50
#221		1/2" Flush	Trimming	1/2"	13/16"	1/2"	$ 8.00
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#845		Tongue & Groove	Straight	1 5/8"	1"	1/2"	$29.00
#546		Tongue & Groove	Wedge	1 3/16"	1"	1/4"	$29.00
#846		Tongue & Groove	Wedge	1 5/8"	1"	1/2"	$29.00
#450		1/8" **Beading**	1/8" R	3/4"	3/8"	1/4"	$11.00
#451		3/16" Beading	3/16" R	7/8"	1/2"	1/4"	$11.00
#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	$13.00
#453		5/16" Beading	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#530		3/16" **Edge Beading**	3/16" Dia. of Circle		1/2"	1/4"	$15.00
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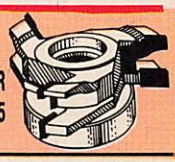

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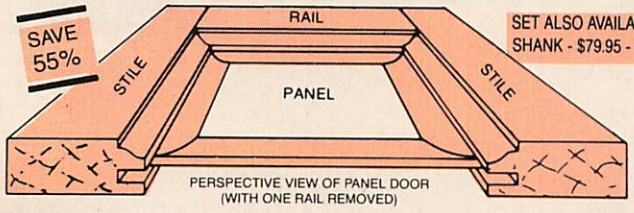

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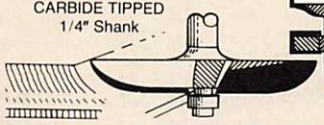

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TALKING BACK

Continued from page 8

Wood in his veins and liking it

Well, if all things in life don't turn 'round and 'round, e.g. the "Finishing Touches" mention in the April 1990 issue about barking trees to reduce weight.

Seems like a few summers in the Northeast during my youth were spent with a spud in like manner—peeling the bark from trees to be sold to the paper mills. The mills in Maine liked wood without the bark and paid premium prices to get it. Anyway, it was a sticky way to make a buck, and the blackflies were awful.

I still have that spud, and from time to time sharpen it up and shave with it. Try that with today's tool steel!

Sign me as one with wood in my veins, who loves your magazine.

James A. Leach, Orono, Maine

Jim, thanks for sharing your memories. Peeling logs destined for paper mills remains a common summertime job in many parts of the nation. In Wisconsin, for instance, kids get about 25 cents a log for peeling popple (aspen). And, yes, those pesky blackflies are still around, too. But, you're the only one we know who shaves with a spud!

Triplets in the shop? Yes!

A while back, a reader wrote about his daughter or granddaughter who hurt herself falling off a stool in his shop. His conclusion was that kids have no business in the shop. I totally disagree. Kids do belong in the shop, albeit with proper supervision. Yes, they will get hurt, but they also will get hurt playing on the playground or learning to ride a bicycle. What craftsman worth his sawdust has never had a subungual hematoma (thumb ouchie)?

Supervision is the key to minimizing shop injuries. I have a set of 12-year-old triplets as well as a 16-year-old daughter. You can frequently find any one of the four in the shop. They are allowed to use hand tools without over-the-shoulder supervision. Power tools require closer supervision and were not introduced in our children until they became middle-school students.

—Larry S. Buege, Marquette, Mich.

Continued on page 16

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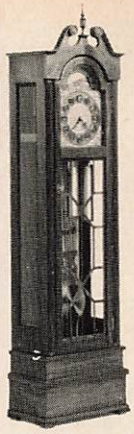

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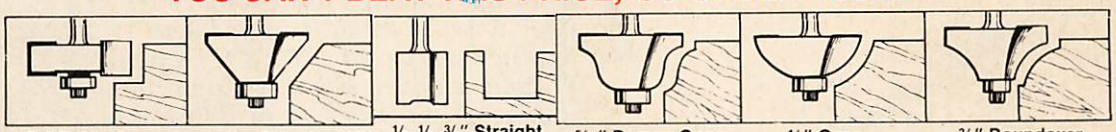

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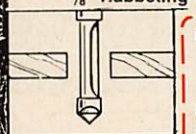

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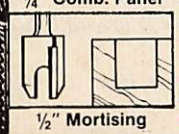

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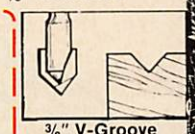

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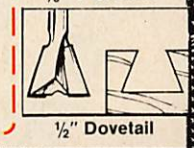

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TALKING BACK

Continued from page 13

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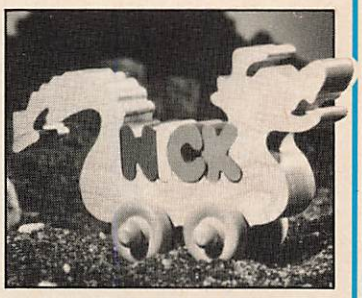


We have tentative plans to publish the cute toy at *right* from the 1989 Design-A-Toy contest, but we've misplaced the tag identifying the toy designer. Can anyone out there help us? Please come forward and call Marlen Kemmet, how-to editor, at 800-678-2666.

Watch out for imitators

Jim Boelling offered an excellent suggestion in your August 1990 "Products That Peform." The single-flute countersink with the "hole in the head" feature is a wise choice for smooth countersunk holes.

The Weldon Tool Co. of Cleveland, Ohio, patented this countersink configuration. Since the patent expired, there have been a number of imported look-alikes appear on the market. None of these, however, perform as well as the original Weldon countersink.

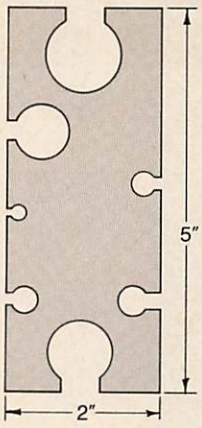
For the name of your nearest distributor, call the Weldon Tool Co., 216/721-5454.

—Paul Muratet, Tulsa, Okla.

Most countersink bits have a tendency to chatter and wobble when countersinking a hole already drilled. For an easy remedy, countersink the mark first and then drill the hole. This way, the countersink has solid wood at its point and can't vibrate.

—Tom Horton, Agincourt, Ontario

In the groove with dowels



Your idea in the April 1990 issue [page 16] about grooving dowels was very interesting. In fact, so interesting that it gave me the idea for this little jig I made for all sizes of dowels. From scrap, I cut a block of wood 2×2×5″ long. Then, I drilled holes ⅛″ from the edge of the block to fit different-sized dowels. On the bandsaw, I cut a lengthwise opening about one-third the size of the hole. You can groove any dowel by inserting it in its proper-sized hole. I hope the sample drawing puts my point across.

—Clement Michaud, Chicago

Your idea and your drawing are just fine, Clement. Thanks for the suggestion.

Illustrations: Jim Stevenson

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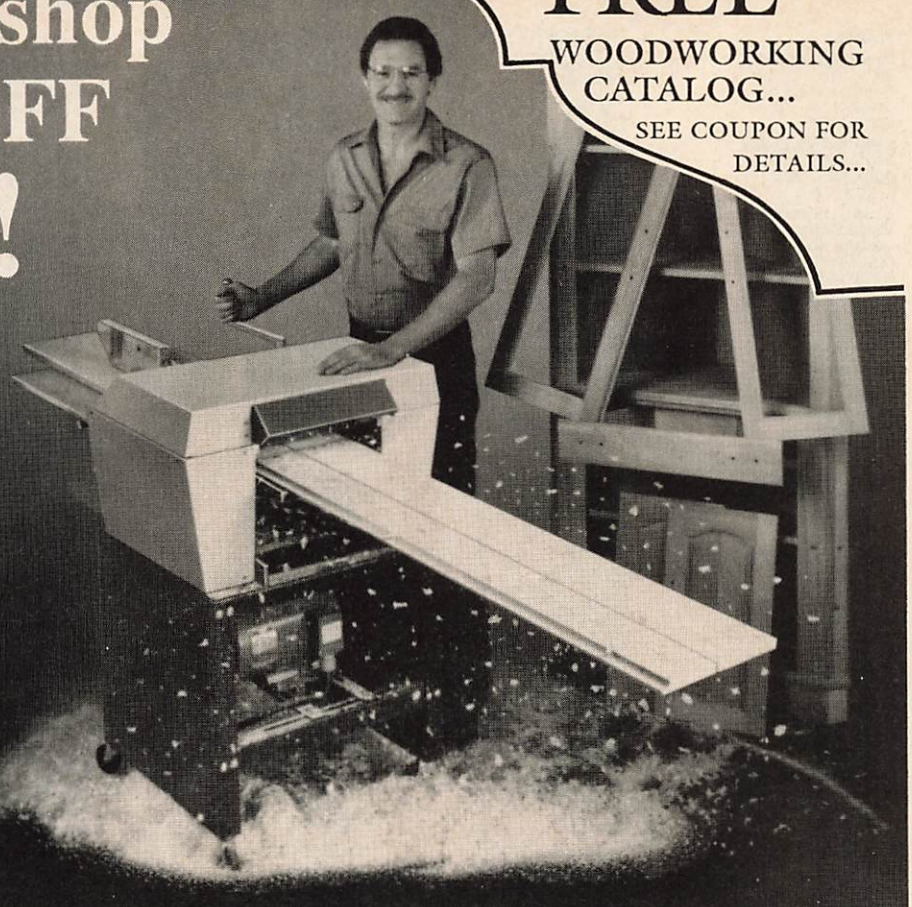

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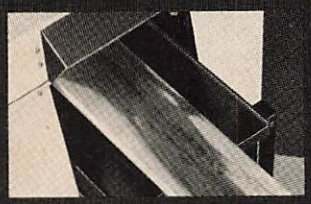

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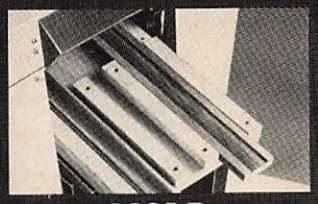
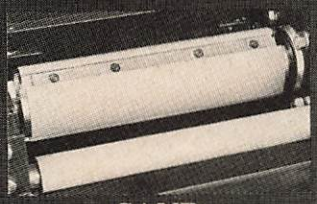


MOLD

SAW



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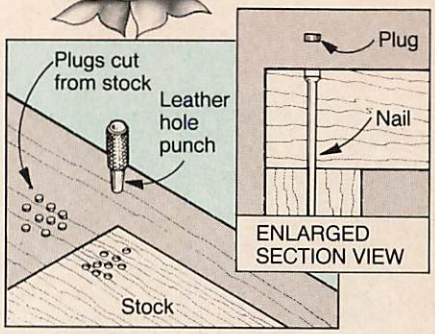
TOP SHOP TIP

Tiny plugs make nail holes nearly invisible

You can buy all kinds of fillers for disguising the holes that remain after countersinking finishing nails, but these often leave telltale results.

TIP: From a piece of scrap that matches your work stock, use leather hole punches to cut tiny plugs to match the size of the nail holes. Set the nails slightly below the surface, and dab a little glue into the indentation with a wood sliver or a paper clip. Then, press the plug into place, making sure the grain of the plug matches the workpiece. It takes a sharp eye to spot these plugs.

—Bill Blain, Edmonton, Alberta



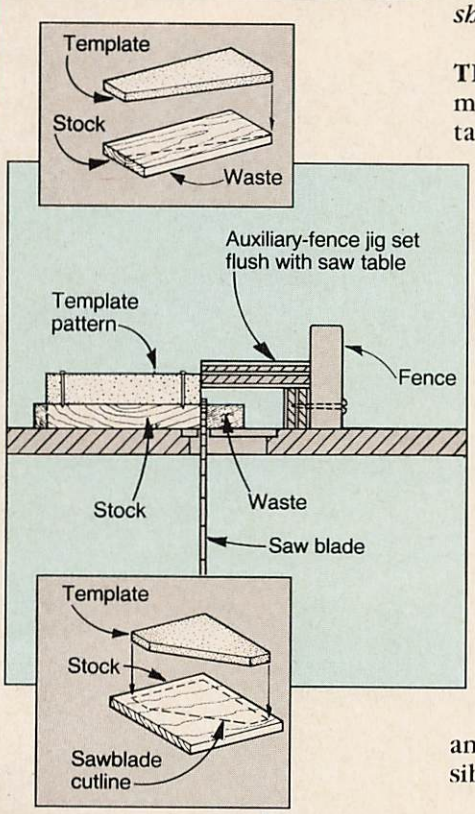
For his tip, Bill receives a Jet model JSG-1 sander.

Jig and templates duplicate irregular shapes

Sometimes, it seems almost impossible to safely and effectively cut several identical irregularly shaped pieces on a tablesaw.

TIP: A simple jig and custom-made templates help you cut tapers or nearly any irregular shape with straight sides. First, build an auxiliary-fence jig of ¾″ plywood that allows plenty of clearance above and to the side of the saw blade as shown at *left*. The jig should be as long as the fence. Now, cut a template of the blank to be duplicated, taking extreme care to ensure correct dimensions and angles. Attach this to the workpiece with brads or double-faced tape, and rough-cut the wood material to within ½–1″ of the final size. (A bandsaw works well for this task.) Then, with the jig attached to the fence, make the final cuts. For safety's sake, turn off the saw after each cut and clear the scraps to avoid possible kickbacks or binding.

—Mike Jagielo, Almond, Wis.

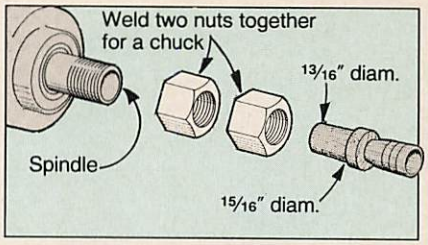


Economy chuck for turning small-diameter stock

If you only occasionally need a small lathe chuck, owning one can be an expensive luxury. Here's a way to make a small chuck for just a couple of bucks.

TIP: Welding two 1″ nuts (8 TPI) together makes a great economy chuck for Delta or Rockwell lathes. (For other brands, check the thread size before purchasing the nuts.) First, turn the blank between centers, tapering one end of the stock from 15⁄16″ to 13⁄16″ as shown *below*. Then, screw the chuck halfway onto the lathe spindle, and screw the tapered end of the workpiece into the available threads of the combined nuts. Now, you can turn a thimble or other small projects.

—Frank Lynn, Kelso, Wash.



Continued on page 23

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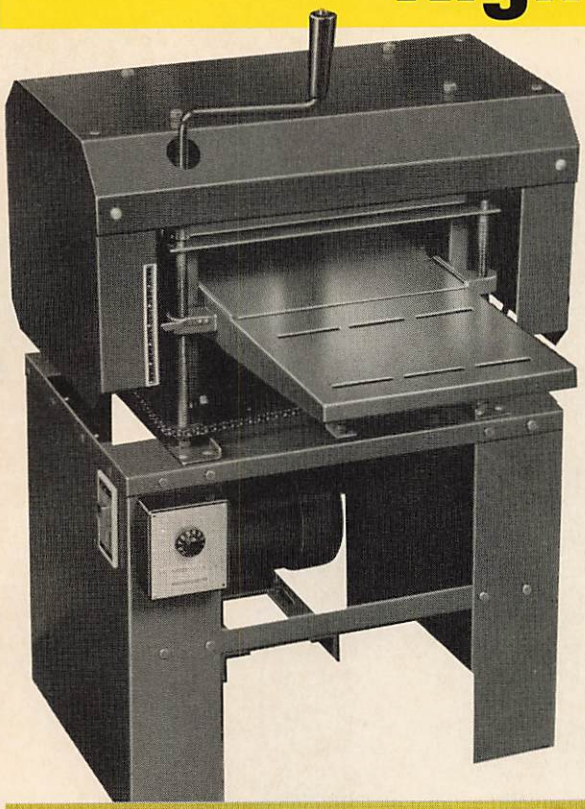

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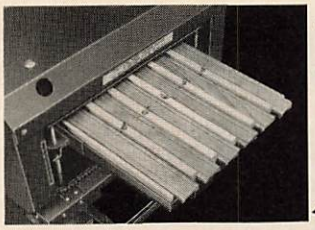

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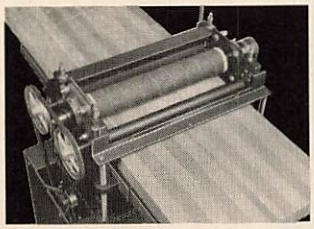

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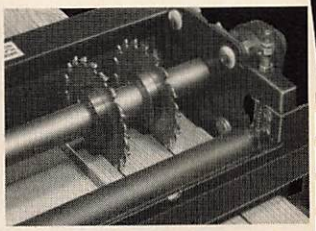

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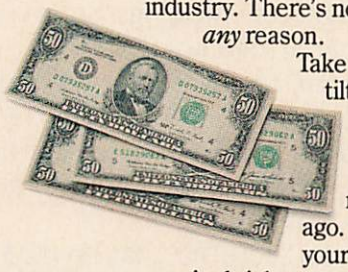

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 20

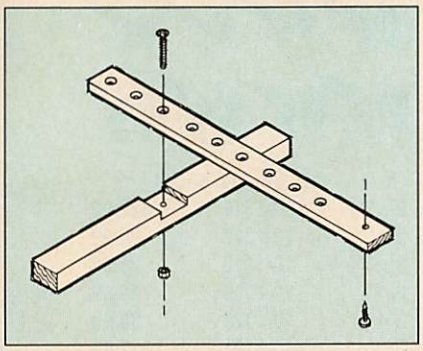
Picture-hanging jig eliminates guesswork

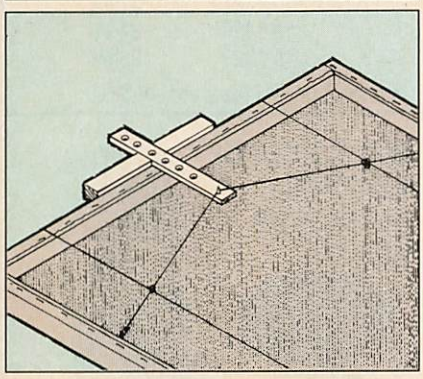
Hanging a picture can be a hit-and-miss affair when you hold the artwork up to a wall and then guess where to position the hanger.

TIP: Make the simple cross-shaped jig shown at *right* by drilling several ¼″ holes about 1″ apart in a 1×12″ piece of ¼″ plywood. Then, cut a ¼″-deep, 1″-wide mortise in the center of a 1×10″ scrap of ¾″ hardwood. Add a ¾″ self-tapping screw about ½″ from one end of the ¼″-thick piece.

Now, lay down the ¾″-thick piece mortise-side-up, and place the ¼″-thick piece into the mortise so the screw points up. Fasten together the two pieces with a ¼″ nut and 1¼″-long ¼″ bolt. Place the bolt in any hole that suits the size of your picture as shown at *right*. With the picture wire draped over the exposed screw point, position the picture on your wall and give the jig a light tap when you find the right spot. The resulting mark from the screw point will tell you exactly where to place the hanger.

—*From the* WOOD *magazine shop*





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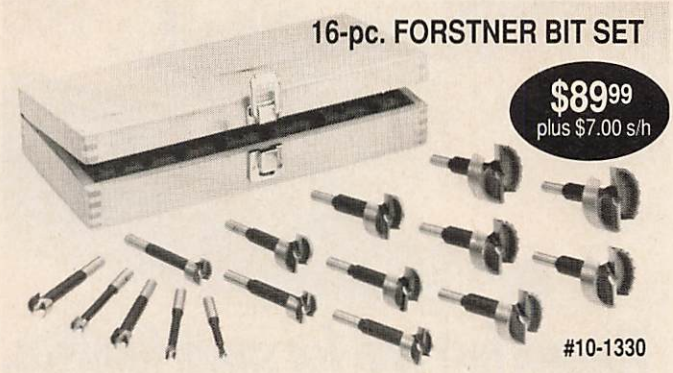

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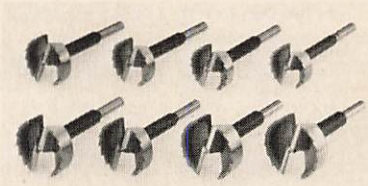

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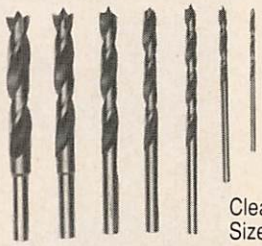

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TIPS FROM YOUR SHOP (AND OURS)

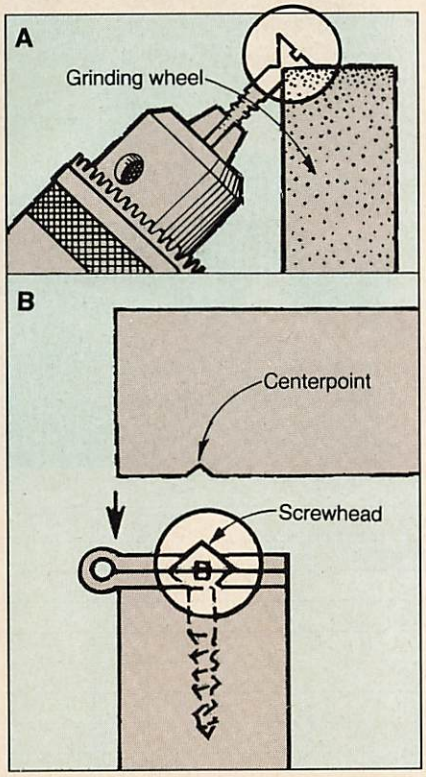
Continued from page 23

Get right to the point for hinge screw holes

Even after careful measuring, you can drill pilot holes for hinge screws that leave hinges and doors slightly out of kilter. Then, both the appearance of the project and the smooth swinging of the door suffer from misalignment.

TIP: From flathead wood screws, make concentric-pointed markers for positioning pilot holes on target. First, tighten a screw into the chuck of your portable electric drill. With a grinding wheel and the drill operating simultaneously, remove the head of the screw as shown in Drawing A *below*. Touch up the newly ground point on the screwhead with a file. After mounting the hinge(s) on the cabinet frame, insert two of these "center finders" into the other half of the hinge, place the door in its correct position as shown in Drawing B, and press it against the hinge to mark the points for drilling pilot holes.

—Gary Paine, Davison, Mich.



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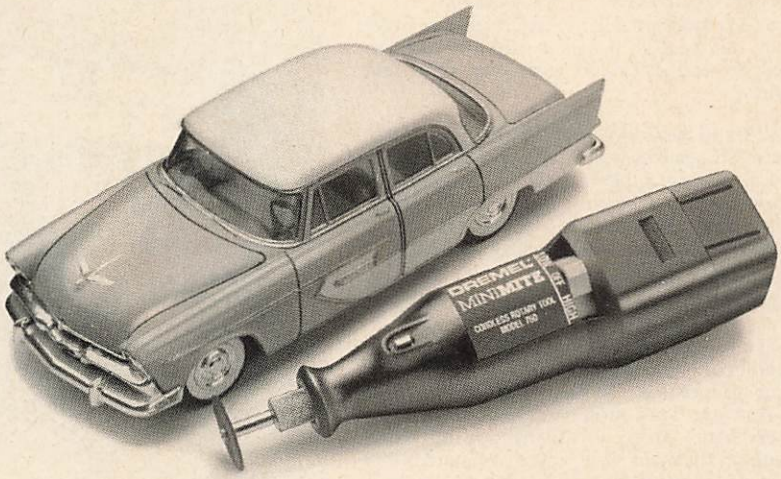

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621	3/8" VSR DRILL	92
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5116	OMNI JIG	263
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7538	3 1/4 HP PLUNGE ROUTER	238
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EY571B	9.6V VS W/KEYLESS CHUCK	$134
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1347A	4 1/2" MINI GRINDER	84
1580VS	VS VAR. ORBIT JIG SAW	99
1581VS	TPO HANDLE JIG SAW VS	129
1601	1 HP ROUTER	95
1604	1 3/4 HP ROUTER	119
1608	LAMINATE TRIMMER	85
1609K	TRIMMER INSTALLERS KIT	159
1611	3 HP PLUNGE ROUTER	195
1651/54	7 1/4" BUILDERS SAW	97
1922K	ORB. CORDLESS JIG SAW KIT	150
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LU84M011	10"x 59T ATB COMBO CARBIDE	41
LU85M010	10"x 80T ATB CUT OFF CARB	56
LU85M014	14"x 108T ATB CUT OFF CARB	97
LM72M010	10"x 24T ATB RIPPING CARB	37
LU73M010	10"x 60T ATB CUT OFF CARB	43
LU87M010	10"x 24T THIN KERF RIP	39
LU88M010	10"x 60T THIN KERF CROSSCUT	46
LU89M010	10"x 72T TC NON FERROUS	64
LU98M010	10"x 80T TCG SUPERIOR	69
LU78M010	10"x 80T ATB CROSSCUT	69
TK206	10"x 24T ATB	20
TK306	10"x 40T ATB	25
TK906	10"x 50T COMBO	27
PS203	7 1/4"x 24T ATB CARBIDE	19
PS303	7 1/4"x 40T ATB CUTOFF	23
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Just a few of the unique woodworking tools of the 3,500 others available from our most versatile tool, the 1991 Garrett Wade Catalog.

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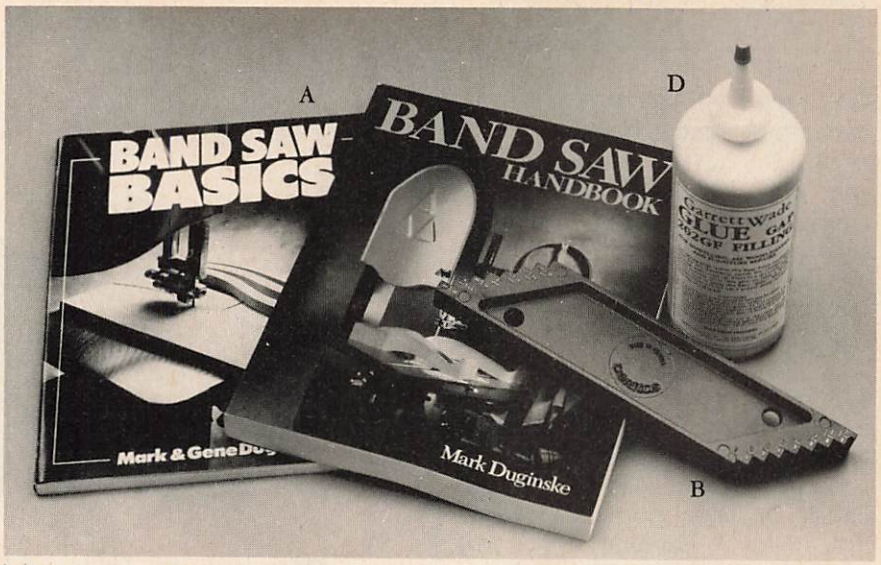


A / 2 Band Saw Books *by Mark Duginske*
Learn what makes your bandsaw tick. Tune-up and maintenance; blade selection, tracking and tensioning; plus cutting methods for various woods and other materials. Hundreds of tips and shortcuts. Unlock your saw's potential.

02L09.03	Band Saw Basics	$ 9.95
16L04.02	Band Saw Handbook	$16.95

B / The Saw Setting Gauge That Can Be Read From Any Position
Most gauges have at least one or two main weaknesses. They either rest partially on the insert plate which is usually not the same height as the main table, or are so thin that it is difficult to ensure that teeth are being gauged at the top of the arc. This gauge is made from machined ¾″ thick Aluminum and is 9″ long. With ¼″ graduations on one end and ⅛″ on the other, it will indicate any height from ⅛″ to 2″. Most useful for table saws but also handy for routers. The markings are vertical on one face and horizontal on the other, so you can read them easily and accurately.

71K26.02	Saw Setting Gauge	$16.95

D/ Our 202GF Gap Filling Glue Fills Gaps
It has a very high solids content so that small gaps in our joinery are actually filled – with strength. And the "squeeze-out" beads right up and chips off when dry. No soaking in to ruin finishes. Dries to a light tan. Water clean-up.

62J01.01	1 pt. 202GF	$ 6.95
62J01.03	1 qt. 202GF	$12.50

C / 1/16″ Super Narrow Blades
You may have never seen a blade like this. A 24tpi raker style, it produces smooth cuts while making incredibly tight turns. We recommend using our Cool Blocks with these delicate blades, because they can be set closer to the blade without danger of overheating.

Cabinetmaker's Special Bandsaw Blades
A Garrett Wade exclusive. They look like "skip tooth" blades. But each tooth is actually formed as a hook, with every 5th tooth an unset raker. The result is a very smooth cutting blade that feeds easily. ¼″ blade is for general work, and ½″ for resawing and heavy straight sawing.

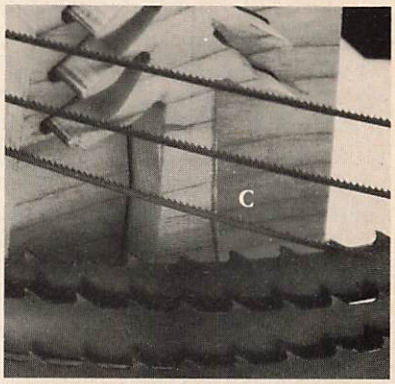
93½″ Blades (Delta 14″ and copies)		
33K11.01	1/16″ Scroll	$15.95
33K11.02	¼″ (4 tpi) Cabinet	$11.95
33K11.03	½″ (3 tpi) Cabinet	$12.95
80″ Blades (Sears 12″)		
33K12.01	1/16″ Scroll	$14.95
33K12.02	¼″ Cabinet	$10.95
33K12.03	½″ Cabinet	$11.95
72″ Blades (Shopsmith)		
33K13.01	1/16″ Scroll	$13.40
33K13.02	¼″ Cabinet	$10.25
33K13.03	½″ Cabinet	$10.95

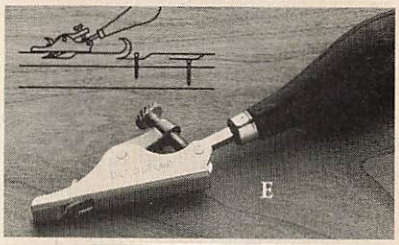
E / The "Blind Nailer" Used To Be A Staple In Every Finish Carpenter's Tool Box
This unique tool allows you to set nails or brads invisibly. Slip the special chisel, with its finger nail shaped cutting edge, into the positioning jig and tighten the clamping screw. Place the flat sole on the wood and strike the end of the chisel with a firm tap with the palm of your hand. The Blind Nailer will lift a perfect small chip from the surface. Hammer your nail or brad in and then glue the chip back in place.

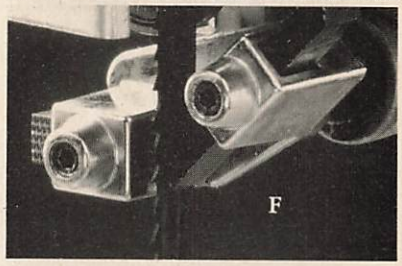
44K01.03	Blind Nailer	$15.95

F / Special Bandsaw "Cool Blocks" Prolong Blade Life & Increase Accuracy
Made of a special graphite impregnated Phenolic laminate, this set of 4 replaces your upper and lower side blade guides. Cool Blocks run cooler and are more slippery than conventional steel guides. Since they can be set actually touching the blade, they give you better control of the cut.

Model		
33K09.01	"A" Delta 14″	$11.95
33K09.02	"B" Sears 12″	$11.95
33K09.04	"D" Shopsmith	$12.95
33K09.05	"E" Old Sears (¼″ Rd.)	$11.95
33K09.06	"F" Jet 14″ (fits Delta copies)	$11.95
33K09.09	"K" New Tilt-Head Sears	$16.95







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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 25

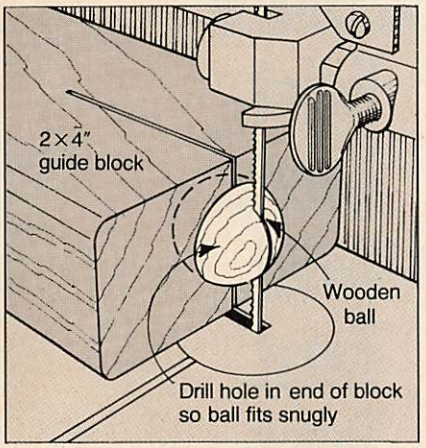
Saw a wooden sphere in half with accuracy

Occasionally, a plan calls for sawing a wooden ball in half. Such is the case for a rocking horse that uses two birch half-balls for eyes.

TIP: In one end of a length of 2×4, bore a hole 1/16" smaller than the diameter of the ball and to a depth that's three-fourths the diameter of the ball. Also, cut a kerf into the block as shown, centered on the hole for the ball. Force the ball into the hole and cut. *(NOTE: The ball must fit snugly into the jig for a safe, accurate cut.)*

Afterwards, shut off the saw, allow the blade to stop, and remove the two halves.

—Henry E. Coleman, Anaheim, Calif.



MORE TIPS FROM OUR WOODWORKING PROS

- If you like exposed joinery, then you'll find many uses for the V-block jig on page 43.
- Follow the box-lid method on page 44 to make lids or doors for other boxes with curved interiors.
- Even if you don't build the sleigh featured on the cover, check out our process for bending wood on page 49.
- For ten tips on furniture restoration, see the boxed information on pages 70 and 71.
- Find out how to add a centuries-old look to wood by using shoe polish. See page 78.

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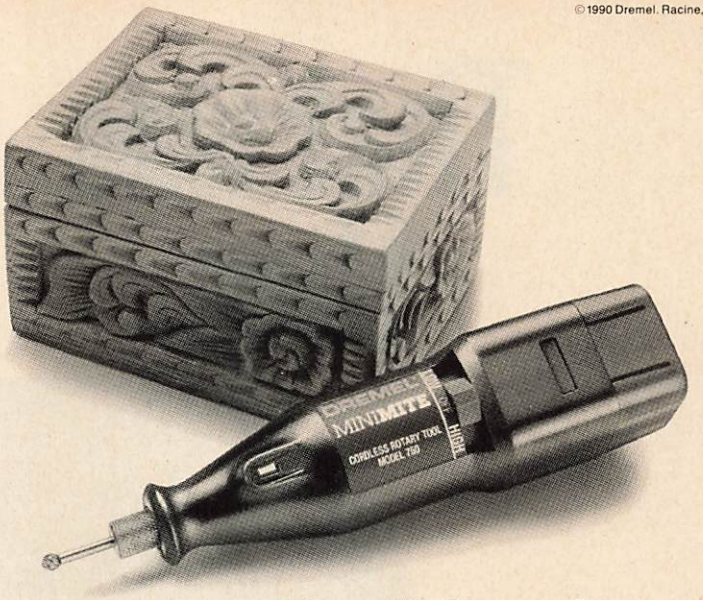


The perfect tool for a little gardening.

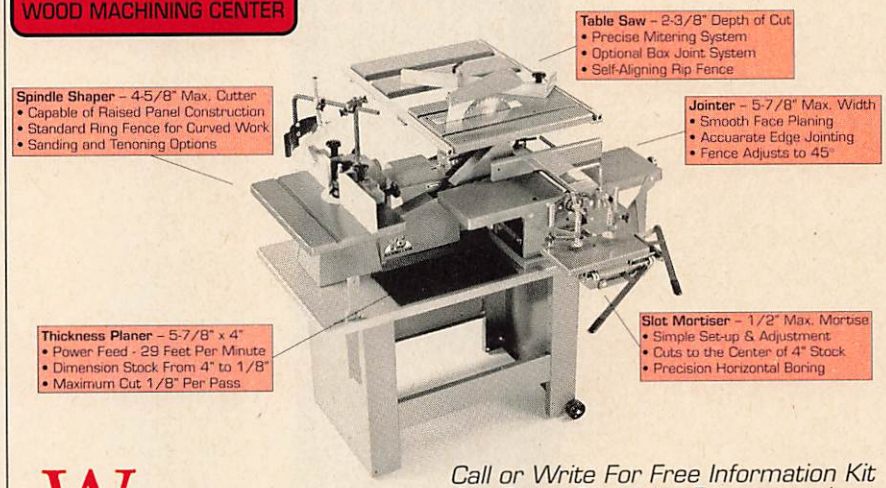
Introducing the new MiniMite from Dremel.® The smallest cordless power tool with a removable, rechargeable battery pack. It has 2 speeds for precision detailing. And takes the thorns out of intricate refinishing jobs.

MINI**MITE**™

Cordless Rotary Tool from Dremel

K5 WOOD MACHINING CENTER

The Basics of Cabinetry



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Twist,
Twist,
Twist,
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*U.S. Patent 4,926,722. Other U.S. and Foreign Patents Issued and Pending.

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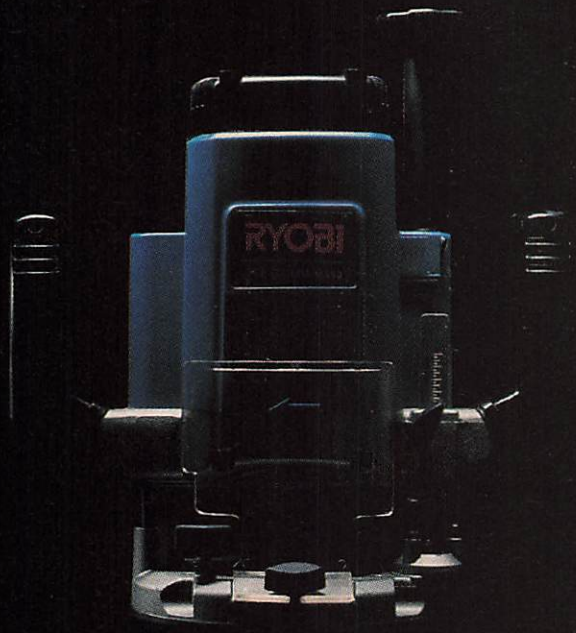

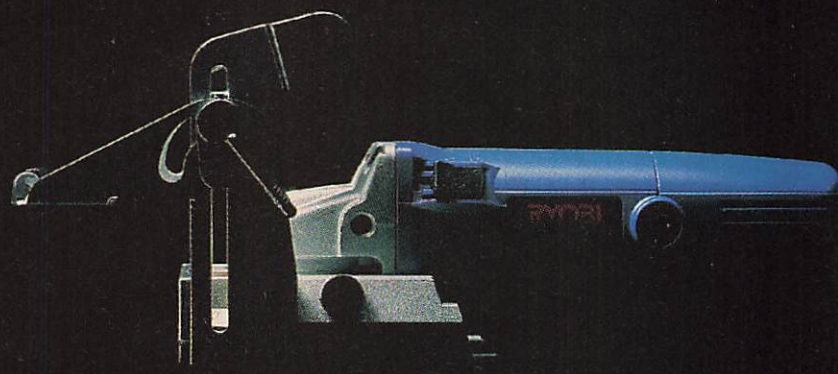

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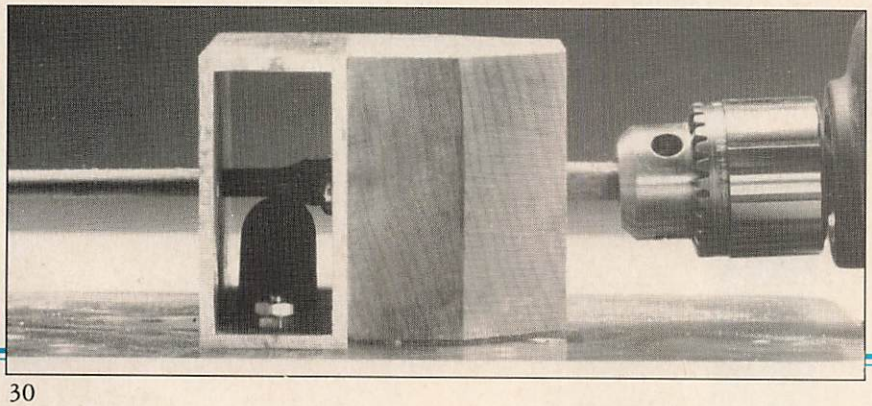
PRODUCTS THAT PERFORM

This jig helps you make your own dowels from any stock

Like all lovers of cherry hardwood, I'd turn cartwheels if I could locate cherry dowels at my favorite hardwood store. Recently, I discovered a nifty device that helps me make ¼" to 1" dowels from *any* hardwood stock. The aluminum-and-maple jig, patented by router guru Brad Witt, bolts to either a table-mounted or portable router. After adjusting a 2¼"-long core-box bit (nothing shorter will work!), the fun began. I really enjoyed pushing stock through the jig with my variable-speed ⅜" electric drill. Best of all, the dowels I turned were exactly the right diameter.

—**Tested by Carl Voss**

Dowel-making jig, available in five sizes for $19.49 each ppd. from Woodhaven. Call 800-344-6657. Extra-long 2¼" core-box bits sell for $24.99 (¼" shank), and $29.99 (½" shank).

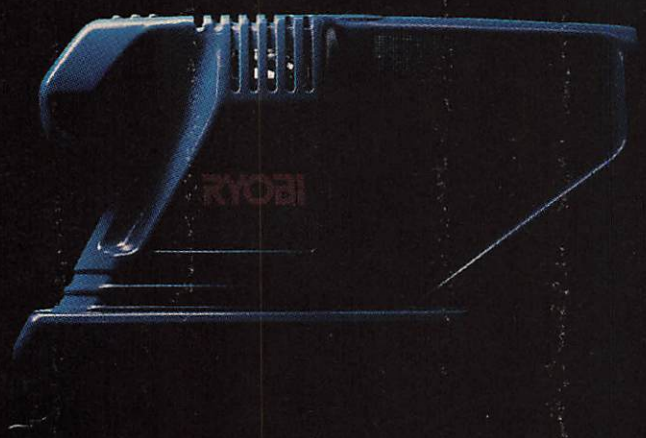


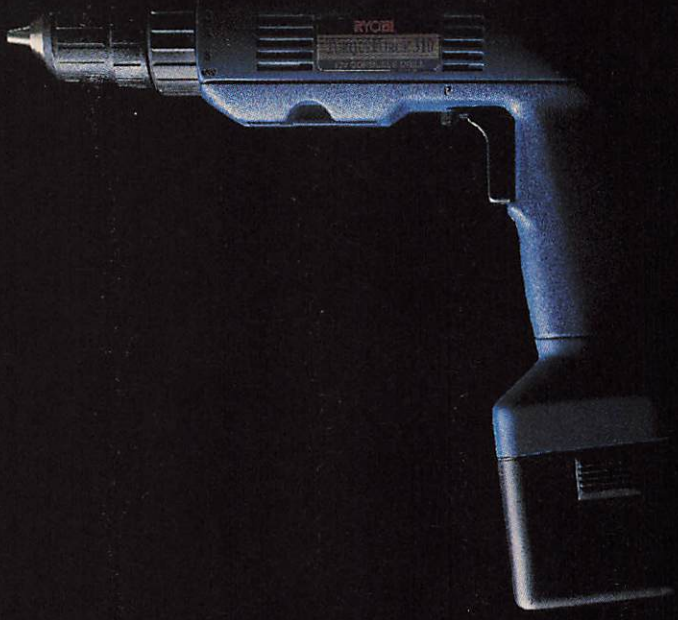
An affordable blade with features and performance

If money's no object, you can choose from many high-priced saw blades that offer premium performance. But, what if you don't have a lot of money to spend on a sawblade? Or, you can afford only one blade for all tasks? Fear not, blades in the new Freud "TK" series produce fast, clean rips or crosscuts at prices affordable to most woodworkers.

I tested the 10", 50-tooth combination model and was impressed with the results. The blade worked well while ripping with a tablesaw, but I was especially pleased with my results while using a radial-arm saw. The blade didn't climb toward me like so many other blades will. The reason: these wood gobblers have an anti-kickback design that limits blade bite to 1/32". It works!

TOOLS ENGINEERED TO LAST A LIFETIME.





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Even though these blades produce a thin kerf, they have stiff bodies that don't wobble during cuts. Why? Unlike similarly priced products, Freud laser-cuts the blanks for these blades from 40-42 Rockwell-hardness steel. Most low-priced blades are stamped from softer steels that flex readily when cutting.

—Tested by Bill Krier

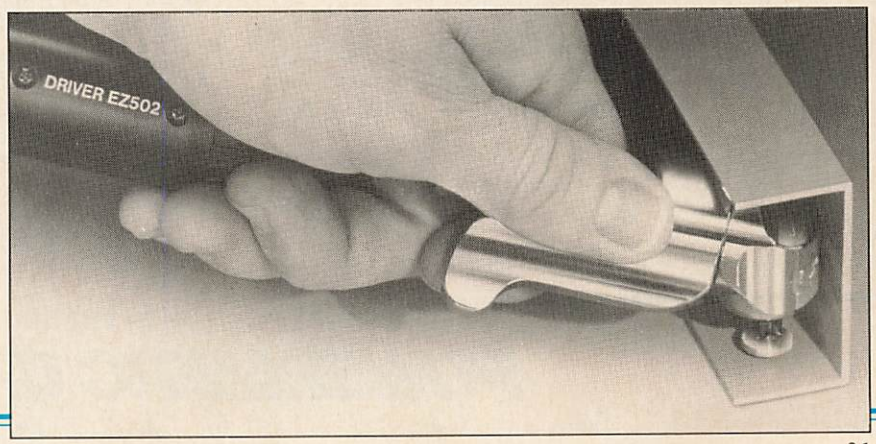
Freud "TK" series blades, $32.90 to $44.90 list for 10-inch models. Other diameters also available, with 24 to 50 teeth. Call Freud at 800-334-4107 or 919/434-3171 for your nearest dealer.

Attachment gets your cordless screwdriver into tight spots

Every now and then, I have to fasten or remove a screw that's located in a tight spot. AEG's offset right-angle screwdriver head fits the bill. The sturdy, all-metal attachment has a magnetic socket that securely holds all of my bits. Bit slippage can be a problem in right-angle situations, but the adjustable thumb flange gave me adequate force and control. The tool works best with AEG's slim, tube-shaped power screwdrivers, but you can two-hand the offset head into position with most any cordless screwdriver.

—Tested by Steve Oswalt

AEG off-set right angle screwdriver head, $24.25 list price. Call 800-243-0870 or 203/447-4600 for the AEG dealer nearest you.



TWO MORE ARTISAN MASTERPIECES

Only an artisan knows the true value of a masterpiece. Powermatic introduces two more masterpieces to its fine collection of Artisan woodworking machines. At prices that reflect economy, exceptional features, and value that will never fade, these masterpieces have extensive industrial specifications drawn from more than 70 years of top-of-the line industrial experience.

Even as this knowledge becomes common, the masterpieces never will. Call your Powermatic Artisan's Line distributor today. Add the Artisan Jointer and the Artisan Band Saw to your collection.

$615

$479

Band Saw Model 43

- Heavy industrial Powermatic saw guide design with side and rear bearings
- Massive, sleekly styled industrial strength welded steel frame
- Carefully balanced cast wheels for smooth operation, with replaceable tires for exceptionally quiet, vibration-free operation
- Under-the-guide cutting capacity in excess of 7"
- Exclusive T-slot cast iron table with double locking trunnion
- Conveniently located blade tension and tracking controls
- Self-contained dust shroud
- ¾ HP motor with removable key switch

Jointer Model 53 (shown with optional dust collection adaptor)

- Clean crisp castings and dovetail design
- Adjustable infeed and outfeed tables for precise setting and accurate cutting
- Patented "controlled chip" cutterhead design: minimizes hazards of kickback, reduces required feeding pressure, and makes clean end grain cuts.
- Chip and sawdust chute for dust control (adaptor optional)
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THE #1 MAGAZINE FOR HOME WOODWORKERS
DECEMBER WOOD® 1990

Yellow BIRCH

The shimmering queen of the north

There's no sight in the woods that quite compares to a stand of yellow birch. The bronze-barked trees glisten against their neighbors. Light bounces off them, as if reflected from metal.

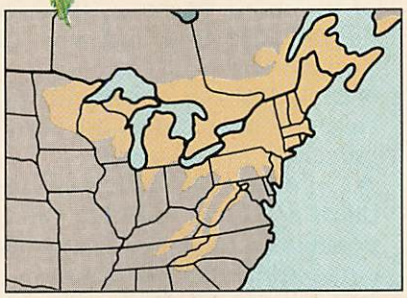
The beauty of yellow birch on the stump probably captivated colonial New England craftsmen, too. But, it was the tree's strong, golden wood that they treasured. From it, they expertly crafted Windsor-style chairs, tables, and other furniture to withstand decades of use and abuse. Centuries later—at the peak of this wood's popularity in the 1950s—homes across the nation featured sturdy, blonde cabinets of yellow birch.

Wood identification

Yellow birch (*Betula alleghaniensis*), also called silver birch and swamp birch, is one of 50 species of birch found around the world. Situated in a wide range across the northern U.S. and Canada, yellow birch grows best in rich, moist woodlands by rivers and streams.

Easily recognized by its metallic-looking bark with numerous papery curls and strips, the forest-grown yellow birch attains 60–70′ heights and 3′ diameters.

Before leaves appear in the spring, twigs bear brown buds and branch ends boast two or three catkins containing pollen. By summer, the buds develop into toothed and pointed leaves measuring about 3–4″ long.



Natural range

Along the branches, small cones with seeds inside appear, only to drop off in the fall.

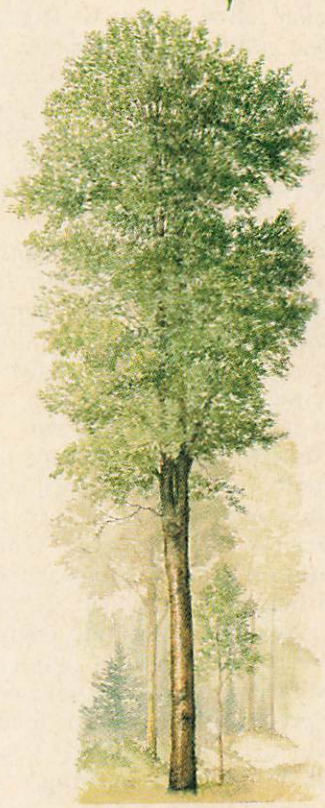
What little sapwood you find in yellow birch will be nearly white, while heartwood has an array of color. The wood varies from cream to golden tan to light walnut. Some wood may even have gray and red tinges.

Although birch has a distinct grain pattern—sometimes displaying waves or curls—the fine-textured wood doesn't always overpower the eye. And, at 43 pounds per cubic foot dry, it weighs almost the same as sugar maple, although it's not as hard.

Uses in woodworking

Along with maple, yellow birch has always been a standard for items that get lots of use—chairs, tables, desks, and cabinets. And, it often turns up as doors and moldings as well as floors.

Many of the turned products sold in homecenters are yellow birch. It's also used for dowels, dowel pins, screw-hole buttons and plugs, and shaker pegs.



Availability

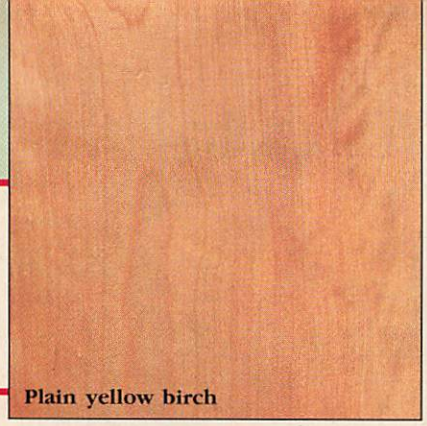
Yellow birch lumber usually sells for less than $2 per board foot, and, except on the West Coast, should be readily available. Stock from the northern part of its range is harder, has fewer defects, and stains better.

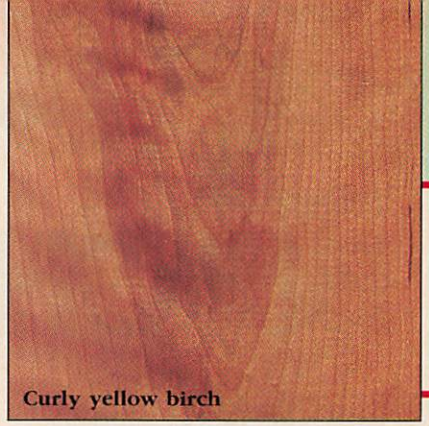
Although you normally won't find lumber with much sapwood, manufacturers of rotary cut yellow birch veneer make the distinction. It's offered as "natural," including heartwood and sapwood, and "select white," from sapwood. Plywood sells for about $50 per sheet.

Continued

PERFORMANCE PROFILE

yellow birch
(Betula alleghaniensis)


Plain yellow birch


Curly yellow birch

Machining methods

Yellow birch machines a little easier than maple, a wood with similar characteristics. That's because yellow birch normally has a finer, more even grain than maple. However, it does have a moderate dulling effect on cutting edges that requires carbide tips. *When yellow birch does misbehave, here's what to do:*

- The wood planes smoothly 90 percent of the time. However, spinning cutters, as on a planer, sometimes catch wavy grain and tear out a pockmark. When this occurs, try reversing the board and taking a shallower cut.
- Yellow birch normally joints cleanly, but trying to decide grain direction to determine feed sometimes can be impossible. When in doubt as to feed direction, set table height for cuts of 1/16" to 1/8" and decide by trial and error.
- Nearly as dense as maple, yellow birch requires ripping with a rip-profile blade of 24 teeth or fewer to avoid clogging. A steady feed rate reduces burning.
- In crosscutting, steel fine-toothed plywood blades work well to avoid splintering. Today's thinly veneered birch plywood splinters easily, too. Score the line to be cut or place masking tape on the kerf line and saw right through it.
- Back drill bits out frequently to clear the hole and avoid burning, especially in end grain.
- Use router bits with ballbearing pilots to avoid burning, and, if possible, rout slowly. Cross-grain cuts require shallow passes.
- Beware of squeeze-out when gluing. Dry glue, when scraped off, can grab the wood and tear it away. To detect squeeze-out, wipe the wood with paint thinner. And, don't let clamps contact squeeze-out—black stains result.
- Wipe yellow birch with a damp cloth to raise grain prior to staining or clear-finishing. Sand, then stain. When grain has a differing color or pattern, expect uneven staining, or first prepare the surface with a product such as Minwax Wood Conditioner.

Carving comments

- Yellow birch, although hard, does take fine detail and has its place in relief work. It requires special handling, however.
- Gouge bevels (15° to 20°) dull quickly. Keep a sharp edge with a 10° bevel on the *back side.*
- Wavy grain will be more difficult to carve because the wavy areas will be harder than the plain.
- Power carvers should not begin with coarse-cutting burrs—the wood splinters. Use medium-cut burrs, then follow with finer ones.

Turning tips

Yellow birch couldn't be easier to turn with sharp tools, aside from these exceptions:

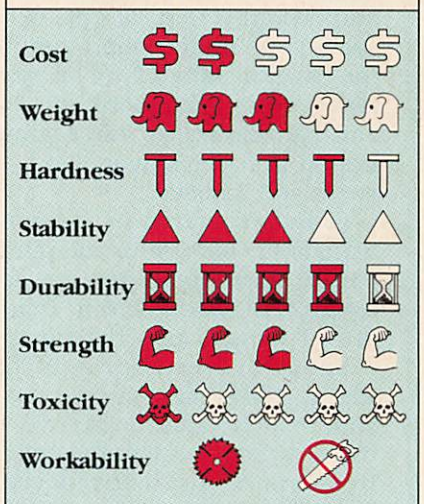
- Scraping can produce splinters.
- Sanding the wood on the lathe across grain produces scratches. Instead, wipe with a damp cloth, then stop the lathe and sand with the grain using fine paper.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions, and special tips pertaining to this issue's featured wood species, appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade that has 24–32 teeth. For crosscutting, use a blade with about 40 teeth.
- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving hardwoods generally means shallow gouge bevels—15° to 20°—and shallow cuts.

YELLOW BIRCH AT A GLANCE



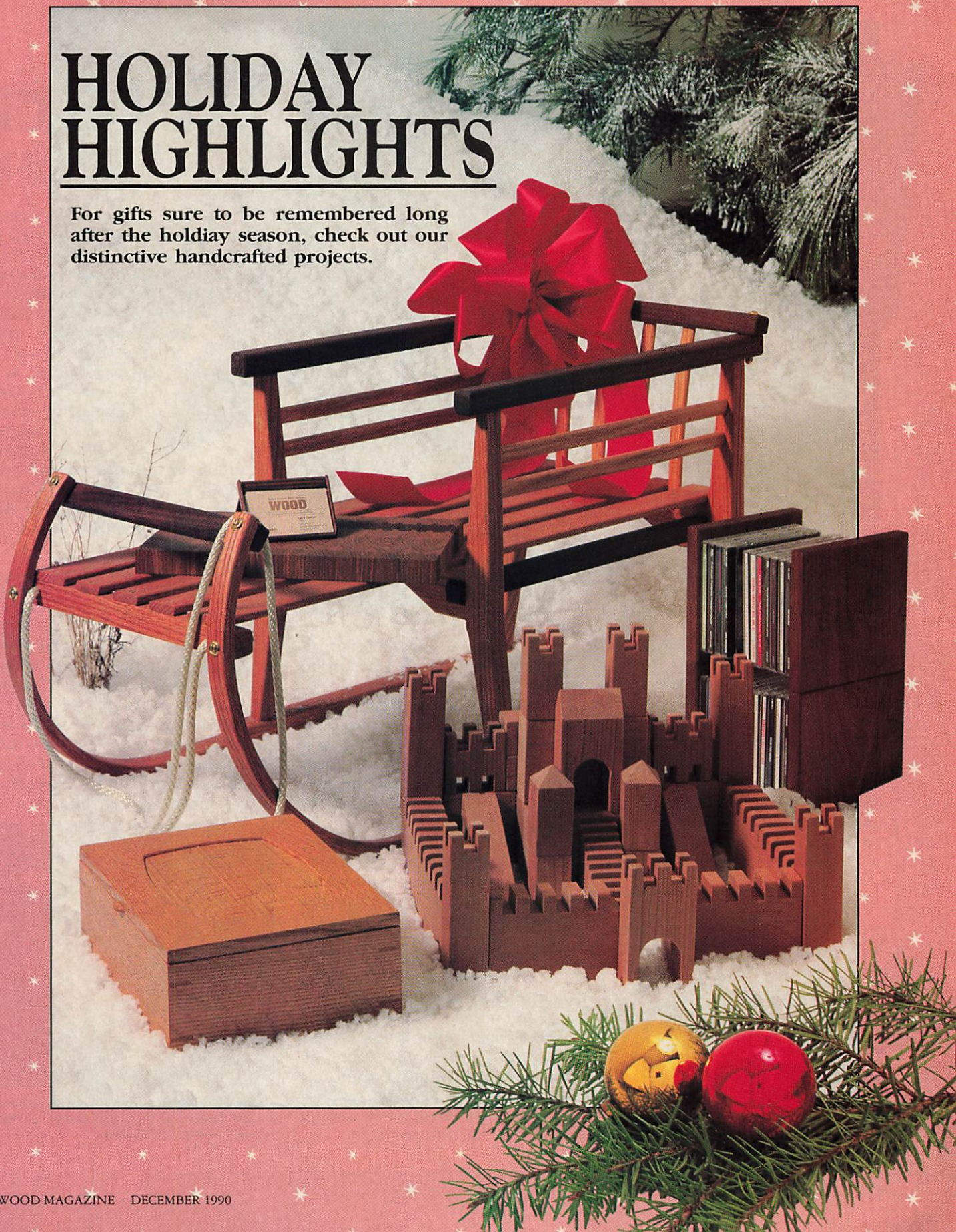
Look-alike Cherry, maple

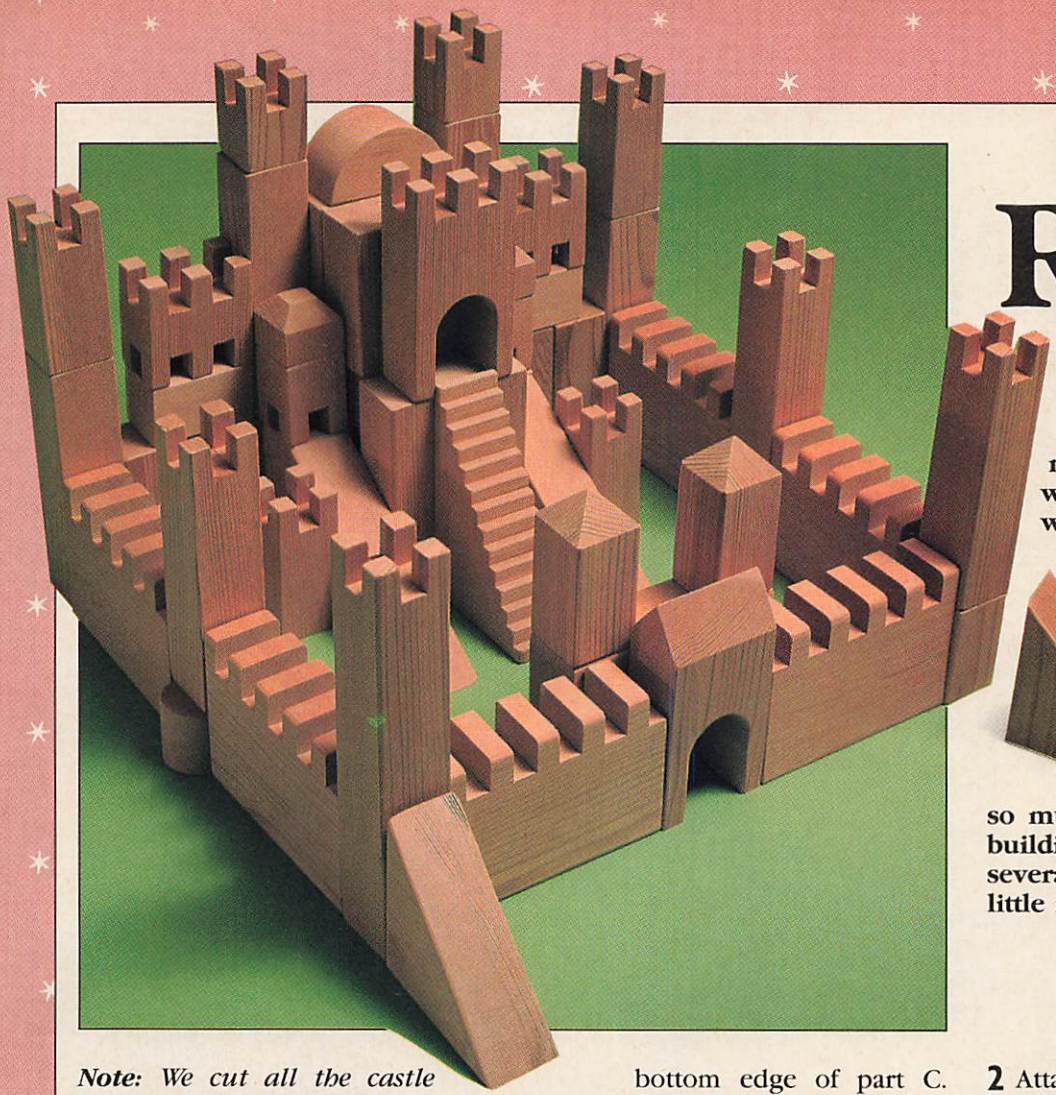
Compiled with woodworkers Jim Boelling, George Granseth, Else Bigton, and carver Phil Odden

Illustrations: Steve Schindler

HOLIDAY HIGHLIGHTS

For gifts sure to be remembered long after the holdiay season, check out our distinctive handcrafted projects.





Return
A BUILDING-

When Christmastime rolled around last year, I wasn't sure a made-in-the-woodshop castle would stand a chance against celebrity dolls and sleek plastic toys. But, my two young daughters, with their active imaginations, have since reassured me. They've spent so much time building and rebuilding castle after castle that several other Christmas gifts do little more than gather dust.

Marlen Kemmet
How-to Editor

Note: *We cut all the castle pieces from 2×4 and 2×6 clear-heart redwood. Pine or fir also would work.*

Let's cut some parts to get this kingdom off the ground

1 Cut parts A, B, and C to the sizes listed in the Bill of Materials. Using the Parts View Drawing for reference, mark a 1½" radius with a compass, centered along the bottom edge of part C. Bandsaw the radiused opening to shape, and save the cutout.

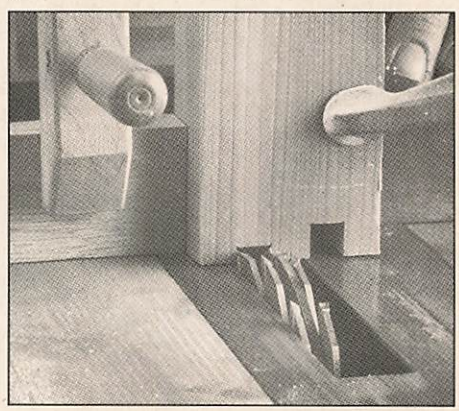
2 Cut a piece of 1½"-thick stock to 3½×3½". Mark a diagonal from one corner to another, and bandsaw the block into two triangles for parts D. Repeat the process with a 3½×5¼" block for parts E.

3 Cut part F to size. Lay out the radiused opening, bandsaw it to shape, and save the cutout. Mark the angled roof lines and bandsaw them to shape.

Less than a knight needed to dado the notches and grooves

1 Cut parts G, H, I, and J to the sizes listed in the Bill of Materials. Cut parts K and L to the thickness and width listed plus 3" in length. Parts K and L are cut extra long for safety when cutting the dadoes in the next step.

2 Attach a wooden fence to your miter gauge and a ½" dado blade to your tablesaw. Cut the ¾"-deep dadoes in parts G through L where shown on the Parts View Drawing and as shown in the photo *below*. (We used a stop block to position and support the pieces when making the cuts.)



Clamp the castle piece to an auxiliary fence fastened to your miter gauge when cutting the dadoes.

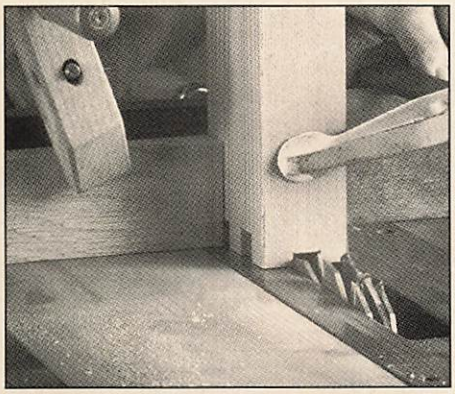
to the Round Table

BLOCK CASTLE FOR YOUR LITTLE PRINCE OR PRINCESS

Angle-cut the ends of a 12″ length of 1½″ square stock to form the pointed ends on each part H. For safety, we started with an extra-long piece.

3 Cut ½″ dadoes ¾″ deep, centered in the ends of parts H through L, as shown *below.* Crosscut parts K and L to the length listed in the Bill of Materials.

4 Using a compass, mark the radius and cut the opening in part H to shape. Save the cutout.



Determine the location, and clamp a stop block to your miter-gauge fence to position and support the castle pieces when machining the centered dado.

Cut a few more parts, and let the fun begin

1 Cut parts M, N, and O to size.

2 To form the pointed ends on parts P, start by cutting a piece 1½″ square by 12″ long. Then, tilt your tablesaw blade 45° from vertical. Using your miter gauge with a stop block clamped in place, cut the pointed ends on each end of the 12″-long piece as shown in the photo *above.* Crosscut two Ps to length from the 12″-long piece.

3 For parts Q, cut a piece of 1½″-square stock to 6″ long. Bevel-cut both ends to the shape shown on the Parts View Drawing. Trim one part Q from each end of the 6″-long piece.

4 To make the staircases (R, S), crosscut a 2×4 to 12″ long. Using a combination square, mark ¼×¼″ steps on part R and ¼×⅜″ steps on part S where shown on the Parts View Drawing. Bandsaw each to shape.

Bill of Materials

Part	Finished Size*			Material	Qty.
	T	W	L		
A	1½″	3½″	5″	redwood	4
B	1½″	3½″	3½″	redwood	4
C	1½″	3½″	5″	redwood	1
D*	1½″	3½″	3½″	redwood	2
E*	1½″	3½″	5¼″	redwood	2
F	1½″	2½″	5″	redwood	1
G	1½″	3½″	5″	redwood	6
H	1½″	2½″	5″	redwood	1
I	1½″	2½″	2½″	redwood	2
J	1½″	1½″	6″	redwood	4
K*	1½″	1½″	3½″	redwood	4
L*	1½″	1½″	2″	redwood	4
M	1½″	1½″	6″	redwood	4
N	1½″	1½″	3½″	redwood	6
O	1½″	1½″	2½″	redwood	4
P*	1½″	1½″	3½″	redwood	2
Q*	1½″	1½″	1¼″	redwood	2
R*	1½″	3½″	3½″	redwood	1
S*	1½″	3½″	5¼″	redwood	1

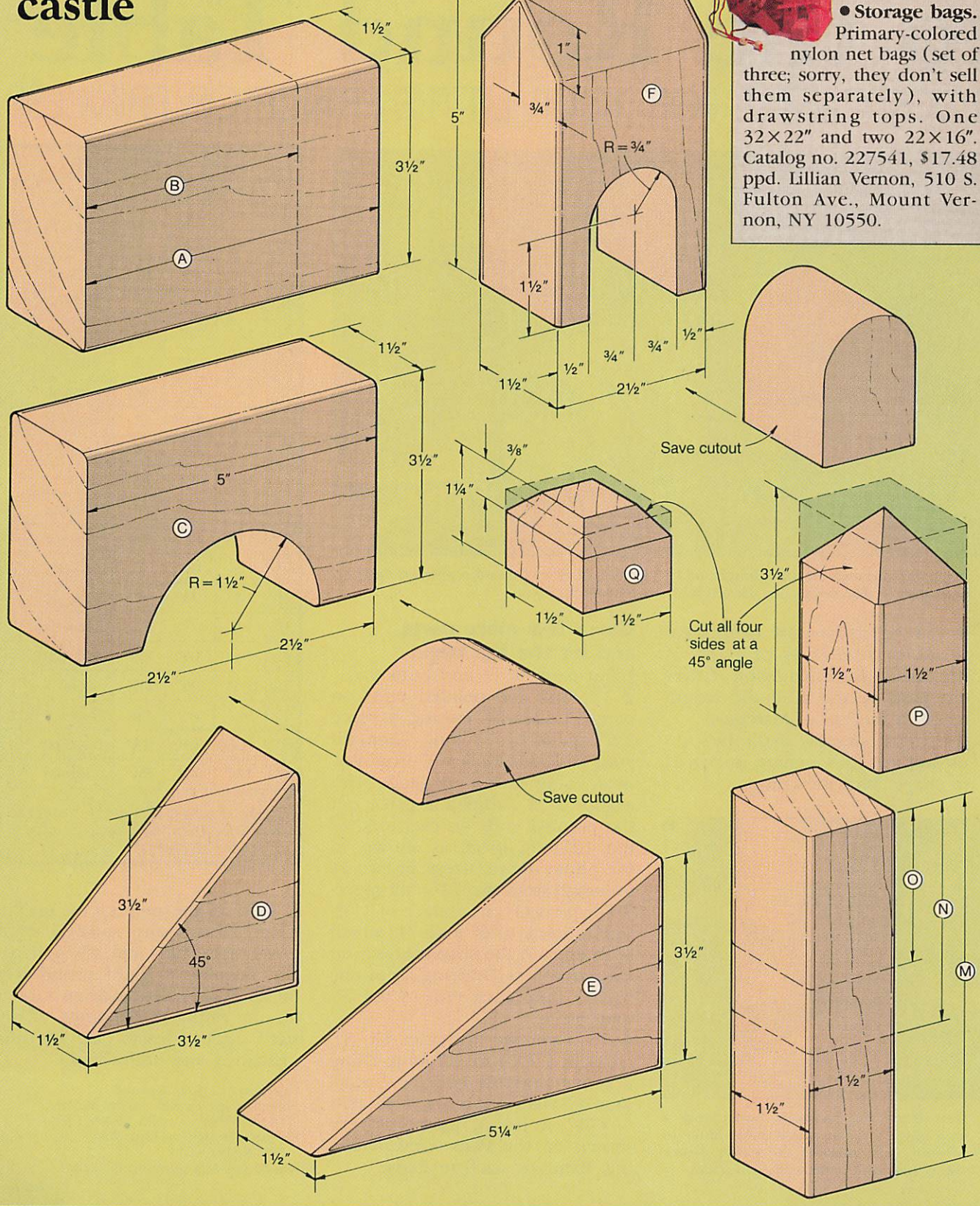
*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

5 Sand all the pieces (we used a palm sander and sanded each piece with 100- and 150-grit paper, forming a slight round-over on all edges). Use a drum sander for the radiused openings. If desired, apply a finish (we left ours unstained and unfinished).

Produced by Marlen Kemmet
Project Design: Donald "Sandy" McNab, McNab Puzzles/Designs, Sanger, Calif.
Photographs: Hopkins Associates; John Hetherington
Illustrations: Kim Downing; Bill Zaun

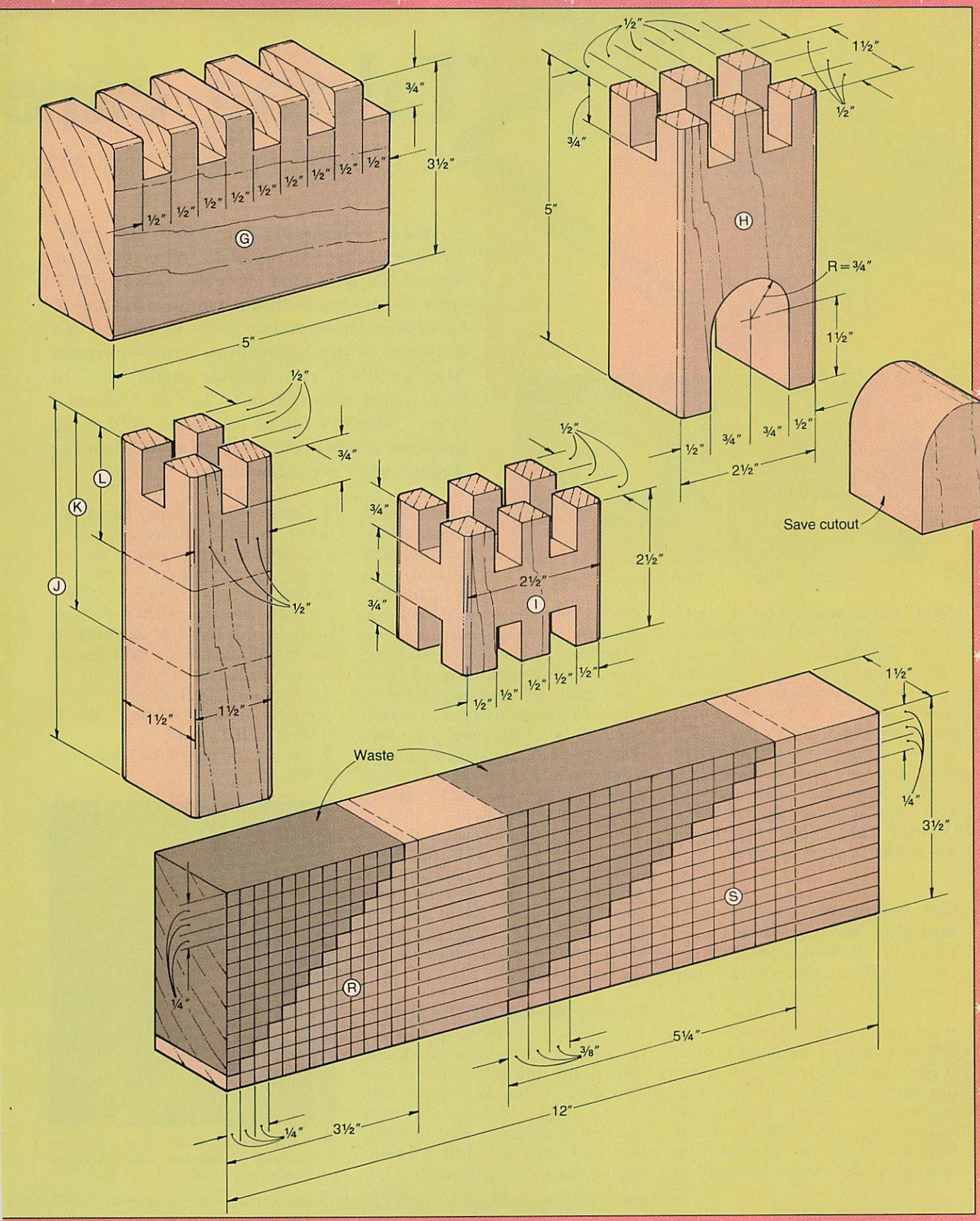
Continued

Building-block castle



Buying Guide

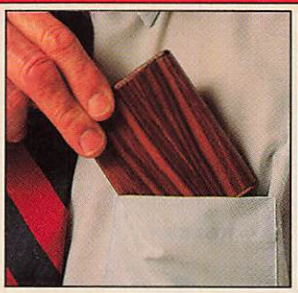
• **Storage bags.** Primary-colored nylon net bags (set of three; sorry, they don't sell them separately), with drawstring tops. One 32×22" and two 22×16". Catalog no. 227541, $17.48 ppd. Lillian Vernon, 510 S. Fulton Ave., Mount Vernon, NY 10550.


G
3/4"
3 1/2"
1/2"
5"
H
1/2"
1 1/2"
3/4"
5"
R = 3/4"
1 1/2"
2 1/2"
Save cutout
J
K
L
3/4"
1 1/2"
I
2 1/2"
Waste
S
R
1/4"
3/8"
5 1/4"
12"
3 1/2"

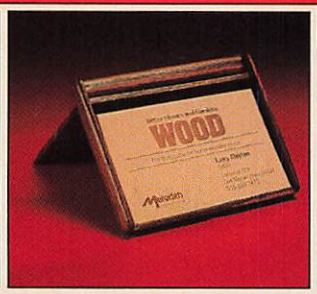
Taking care

A clever card case that

Business is booming for Wisconsin woodworker Michael Mikutowski. When Mike designed his first business-card case in 1986, little did he know that it would continue to be a popular item for years to come. "It's still one of my best-selling items—perhaps because it's a neat display stand, too. In fact, I now make them in lots of 1,000 at a time." That's a lot of business! Fold it up and take it with you, or open it and proudly display your business cards.



Closed for carrying



Fully opened for display

***Note:** You'll need some ⅛" stock for this project. You can plane or resaw thicker stock to size, or see the Buying Guide for our source of morado, sometimes call Bolivian rosewood. If you resaw or plane your own stock, let it sit a couple of days to see if it cups. The stock you use must remain flat.*

Also, business cards vary in size. We built our holder for a 2⅛x3½" card. Adjust the size of the holder to fit your cards.

Cut the parts and glue 'em together

1 Cut the lid hinge parts (A), top (B), tray front and back (C), tray bottom (D), and tray sides (E) to the sizes listed in the Bill of Materials. (We cut the pieces on our tablesaw using a thin-kerf blade.) If you use the Buying Guide to order stock (enough for four boxes), see the Cutting Diagram for minimum waste. (We found it safer to cut the the narrow parts first. Also, we clamped a stop on our radial-arm saw fence to ensure consistent lengths of parts A, B, C, and D.)

2 With the edges and ends flush, glue the lid-hinge parts (A) together face to face. (For ease and quickness of assembly of such small parts, we used gap-filling cyanoacrylate adhesive—instant glue—to bond the parts. Cyanoacrylate is available at most hobby shops. To clamp the tiny lid-hinge parts together, we used ordinary wooden clothespins.)

3 To form the lid, glue the lid hinge (A) flush with the back edge and ends of the lid top (B).

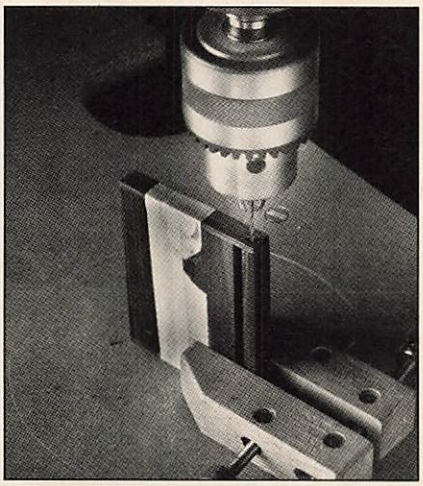
4 To form the tray, glue the front and back pieces (C) to the tray bottom (D). Keep the ends flush. Then, glue the tray sides (E) to the tray assembly.

Pinning the lid to the tray

1 Using the Hole Detail at *far right* for reference, mark the hinge-pin centerpoint on both ends of the tray sides. Using an awl or nail, make a slight indentation at each marked centerpoint. The indentation will keep the drill bit from wandering in the next step.

2 Using masking tape, fasten the lid to the tray with the edges and ends flush. Lightly clamp the assembly in a handscrew clamp as shown in the photo *below.* Chuck a 1/16" bit into your drill press, and position the tray/lid assembly so the bit aligns directly over the indented hinge-pin centerpoint on the tray side. Drill a 1/16" hole ½" deep in both ends of the holder as shown in the photo.

3 Cut two pieces of 1/16" brass rod to 9/16" long.



Mark the location of the hinge pins, tape the assemblies together with the edges and ends flush, and drill 1/16" holes.

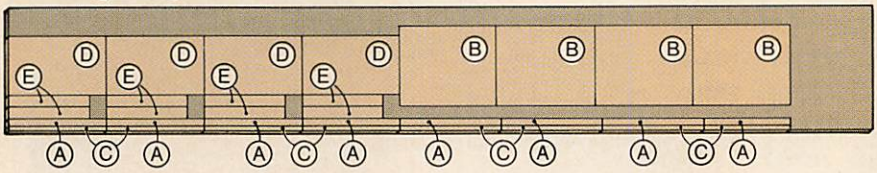
Produced by Marlen Kemmet Project Design: Michael Mikutowski, Mikutowski Woodworking

# of business

doubles as a display stand

Cutting Diagram (Enough for four cases)

1/8 × 4 1/2 × 32" Morado



Bill of Materials						
Part		Finished Size			Matl.	Qty.
		T	W	L		
A	lid hinge	1/4"	5/16"	3 5/8"	LM	1
B	lid top	1/8"	3"	3 5/8"	M	1
C	tray back & front	1/8"	3/16"	3 5/8"	M	2
D	tray bottom	1/8"	2 1/2"	3 5/8"	M	1
E	tray sides	1/8"	7/16"	3"	M	2

Material Key: LM-laminated morado, M-morado
Supplies: 1/16" brass rod, finish.

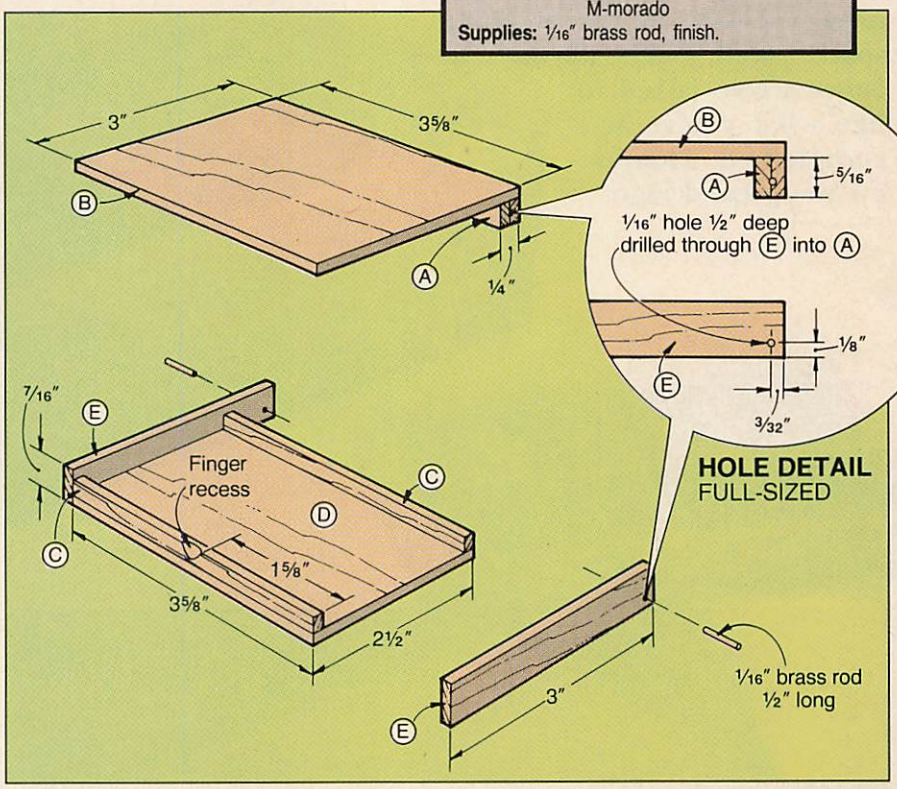
4 Remove the tape to separate the lid from the tray. Using the pointed end of a pin or toothpick, put a small amount of instant glue into each 1/16" hole in the lid hinge (A). Insert the pins through the tray sides (E) and into the lid hinge to pin the lid to the tray sides. Sand the ends of the brass pins flush with the surface of the tray sides.

Add the finger recess, round-overs, and finish

1 Sand all surfaces and ends flush. Close the lid, and sand or rout 1/8" round-overs along the outside edges of the case.

2 Measure in 1 5/8" from the inside surface of both E's, and mark a pair of lines on the tray front (C) to locate the finger recess where shown on the drawing. Wrap 150-grit sandpaper around a 3/8" dowel, and sand between the lines to form the finger recess. (The size of the recess depends on personal preference. For those with small fingers, a shallow recess was sufficient. We recommend a deeper and wider recess for someone with larger fingers.)

3 Finish-sand the holder (inside and out) and apply the finish of your choice, rubbing lightly with steel wool between coats. To help prevent warping, apply an equal number of coats to the inside and outside surfaces.



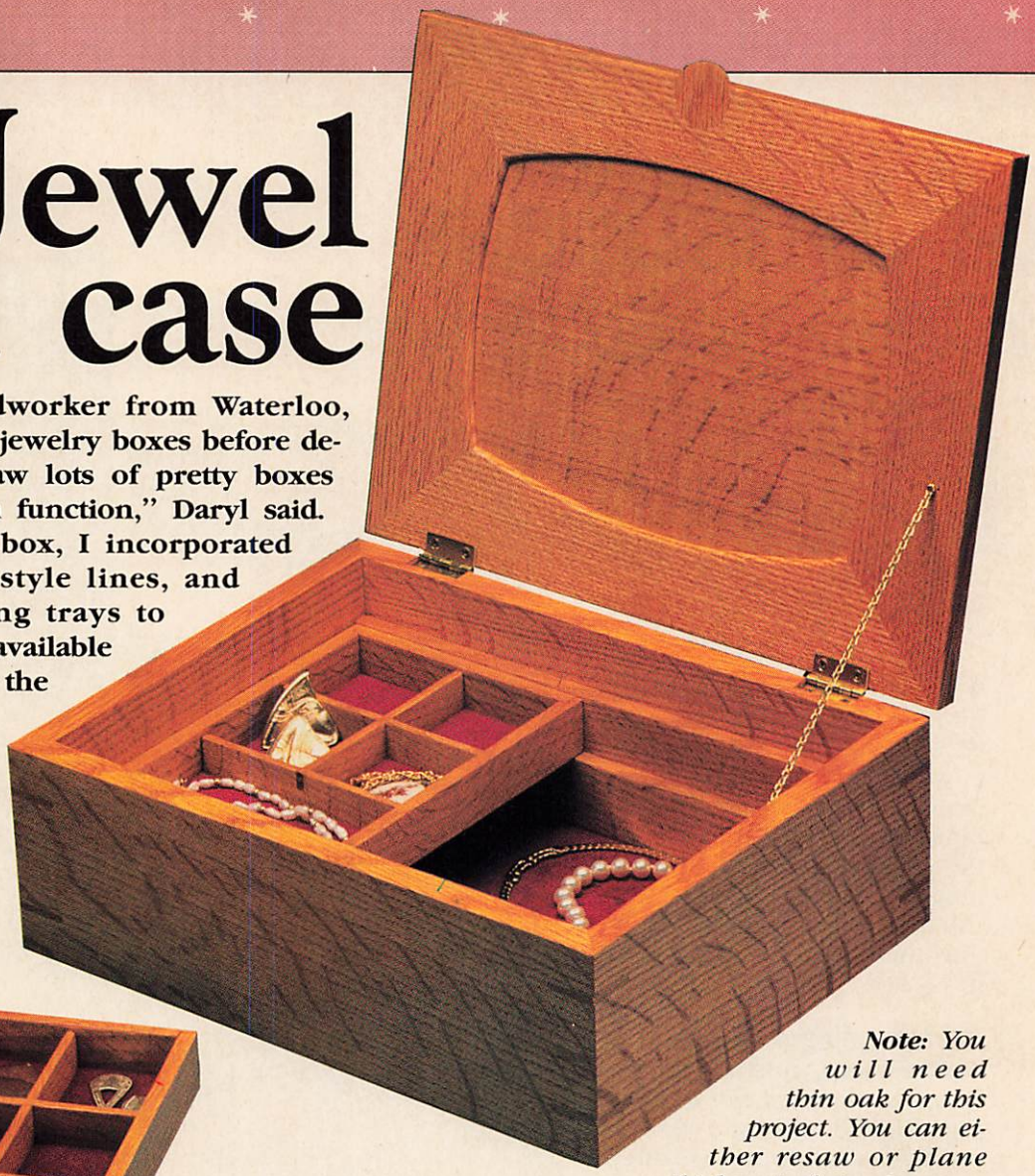
Buying Guide

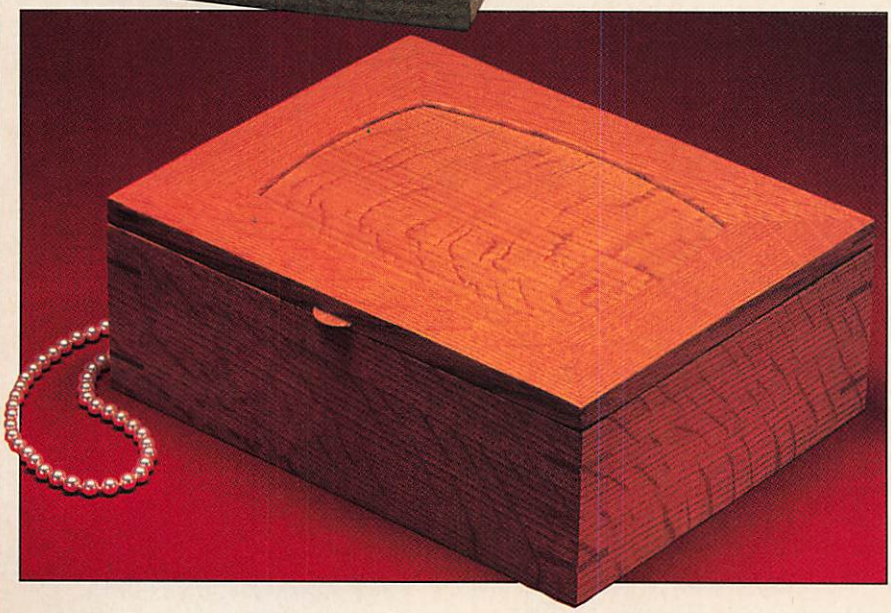
• **Exotic wood.** 1/8 × 4 1/2 × 32" morado (enough for four boxes), $7.95 ppd for one piece, two pieces for $12.95 ppd, or three pieces for $16.95 ppd. Add $1 for a 6" length of 1/16" solid brass rod (for the hinges) or $2 for a 12" length of rod. Woodworkers' Dream, 510 Sycamore Street, Box 329, Nazareth, PA 18064, or call 215/759-2837.

Photographs: Hopkins Associates; John Hetherington Illustrations: Kim Downing; Bill Zaun

Jewel of a case

Daryl Morgan, a woodworker from Waterloo, Iowa, studied plenty of jewelry boxes before designing this one. "I saw lots of pretty boxes with little emphasis on function," Daryl said. "When designing my box, I incorporated simple Scandanavian-style lines, and then added two sliding trays to make the best of the available space." Well, Daryl, all the ladies we've talked to like what you've accomplished. Thanks for the great design.





***Note:** You will need thin oak for this project. You can either resaw or plane thicker stock to size.*

Eight splines make for a sturdy box

1 Cut a piece of ½"-thick oak to 3½" wide by 42" long for the front, back, and ends. Cut a ¼" rabbet ¼" deep along one edge.

2 Square your miter gauge to your saw blade, and then tilt the blade 45° from vertical. Cut scrap to verify the angle setting. Now, miter-cut the front and back (A) and ends (B) to the lengths listed in the Bill of Materials from the 42"-long piece.

3 Sand the inside face of each piece (A, B). Next, glue and clamp together the pieces, checking for square and making sure that the top and bottom edges remain flush.

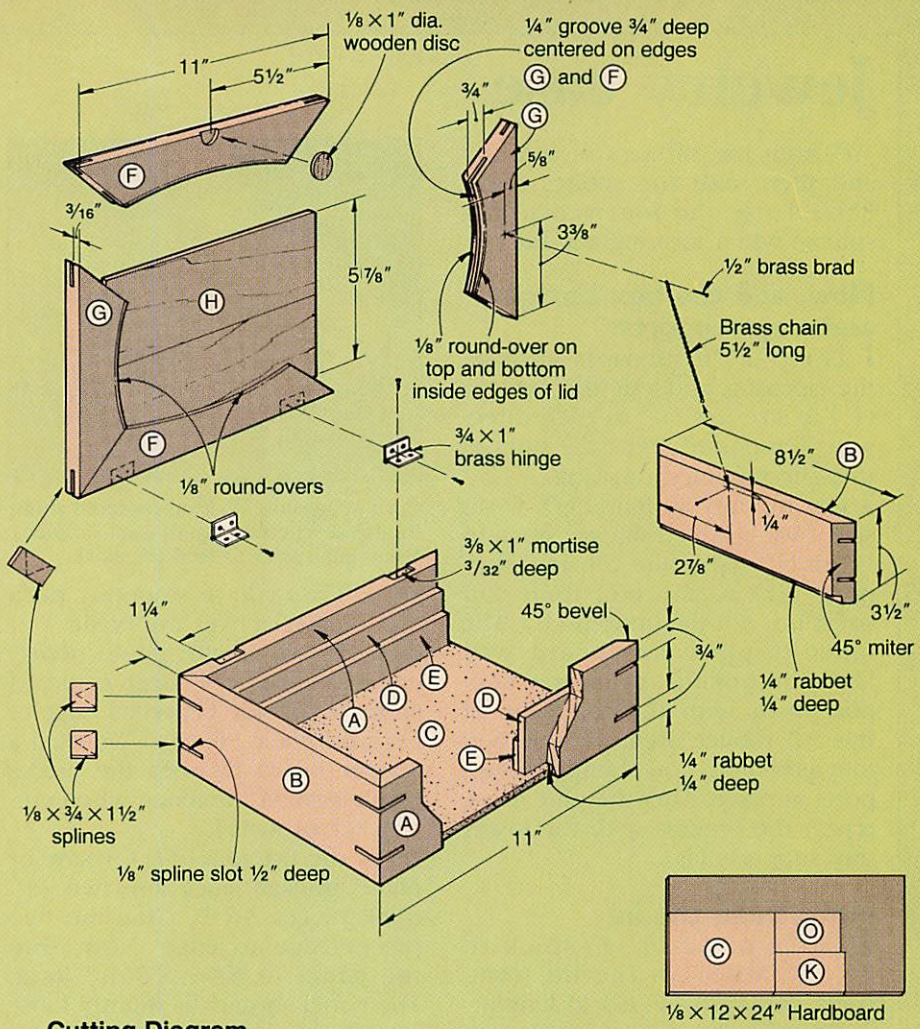
Bill of Materials

Parts		Finished Size* T	W	L	Matl.	Qty.
BOX AND DRAWER SUPPORTS						
A*	front & back	½"	3½"	11"	O	2
B*	ends	½"	3½"	8½"	O	2
C	bottom	⅛"	8"	10½"	H	1
D	top dwr. support	¼"	2¼"	10"	O	2
E	btm dwr. support	¼"	1¼"	10"	O	2
LID						
F*	front & back	½"	2"	11"	O	2
G*	ends	½"	2"	8½"	O	2
H*	panel	¼"	5 15/16"	8 7/16"	EO	1
TRAYS						
I	ends	¼"	⅞"	4¼"	O	4
J	front & back	¼"	⅞"	7 7/16	O	2
K	bottom	⅛"	4¼"	7 3/16"	H	1
L	divider	⅛"	⅝"	4"	O	5
M	divider	⅛"	⅝"	6 15/16"	O	1
N	front & back	¼"	⅞"	6 15/16"	O	2
O	bottom	⅛"	4¼"	6 11/16"	H	1
P	divider	⅛"	⅝"	3⅞"	O	1

*Initially cut parts marked with an * oversized. Then, trim each to the finished size according to the how-to instructions.

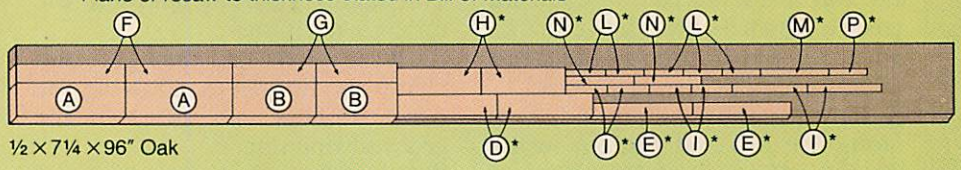
Material Key: O—oak, EO—edge-joined oak, H—hardboard

Supplies: ¾×1" brass broad hinges (Stanley CD5302), ½"×17 finish nails, velour fabric, spray-on adhesive or carpet tape, necklace chain, 2—⅜" brass brads, stain, finish.



Cutting Diagram

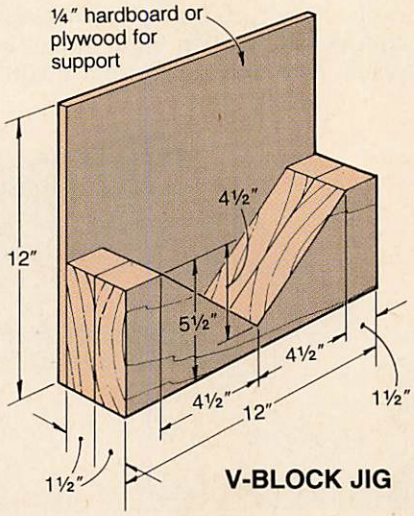
*Plane or resaw to thickness stated in Bill of Materials



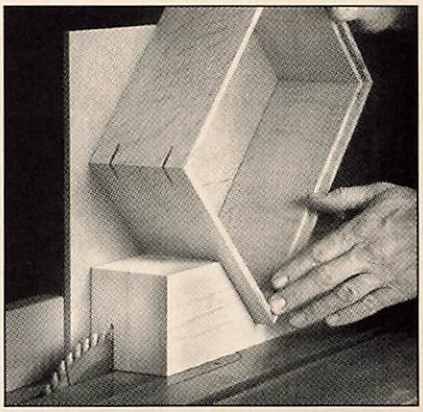
4 Using the drawing at *right* as a guide, build a V-block jig. Now, raise the tablesaw blade 1½" above the surface of the saw table. Position the fence 1" from the inside edge of the saw blade and cut a pair of slots in each corner of the mitered box as shown in the photo at *far right*.

5 To form the splines, cut a piece of ⅛" stock (we resawed thicker stock) to ¾" wide by 22" long. Then, crosscut twelve 1½" long splines from the stock. Glue a spline into each slot in the box. After the glue dries, trim the splines (we used a dovetail saw)

Continued



V-BLOCK JIG



Using the V-block jig shown in the drawing at left for support, cut a pair of spline slots in each corner of the box.

Jewelry case

1/16" from the surfaces of the box and then sand the splines flush. (You'll use the four remaining splines when forming the lid.)

Now, add the box bottom and tray supports

1 From 1/8" hardboard, measure the opening and cut the bottom (C) to size less 1/16" in each direction. Temporarily tape the bottom into the rabbeted opening.

2 Cut the tray supports (D, E) to size. (We resawed thicker stock to 1/4" thick.) Glue the top tray supports (D) to the box front and back, but not the bottom (C). The taped-in-place hardboard will keep the bottom of the tray support flush with the top edge of the 1/4" rabbet. Remove the bottom as soon as you clamp the supports in place. After the glue dries, repeat the process with the lower tray supports (E).

Next, build the lid

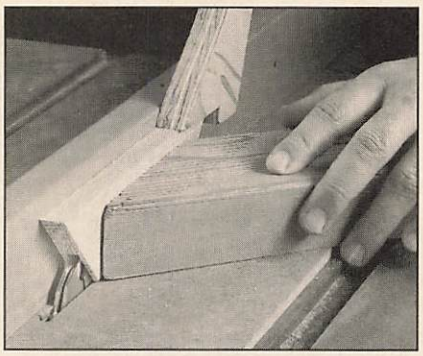
1 Cut a piece of 1/2" stock to 2×42". Miter-cut the lid front, back, and ends (F, G) to length.

2 Transfer the curve patterns to the top inside surface of each lid piece. Bandsaw the curves smooth. Sand the bandsawed edge to remove the saw marks.

3 Rout or sand 1/8" round-overs along the top and bottom inside curved edge of each lid piece.

4 Fit your tablesaw with a 1/4" dado blade. Now, position the fence so the dado blade will cut a 1/4" rabbet centered along the curved edge of each lid piece.

5 With double-faced (carpet) tape, adhere a piece of thin hardboard or plywood to your saw top and butted against the fence. Start the saw, and raise the dado blade 3/4" above the surface of the hardboard. The hardboard acts as a zero-clearance insert and keeps the bottom edge of the lid parts from falling into the slot around the blade as they would with a standard blade insert. The insert also allows you to smoothly push the lid pieces over the blade.



Cut a 1/4" groove 3/4" deep centered along the inside-curved edge of each lid piece. Use a push stick to feed the stock.

6 As shown in the photo *above,* cut a 1/4" groove 3/4" deep centered along the inside (curved) edge of each lid piece (F, G). (We used a feather board to keep the pieces firmly against the fence when cutting the groove.)

7 For the lid panel (H), resaw or plane thicker stock for two 1/4"-thick pieces 3×9". Glue the two pieces edge to edge. Now, trim the panel to 5 15/16×8 7/16" long. The panel should fit slightly loose in the assembled lid, allowing it to expand without splitting the mitered lid joints.

8 Check the fit, and then glue and clamp the lid pieces, allowing the panel to float (no glue) in the grooved opening.

9 Using the spline jig, cut a 1/8" spline slot 1/2" deep centered in each corner of the lid. Using the splines cut earlier, glue them in place; trim and sand them flush.

Hinge the lid, and form the finger pull

1 Mark the location and form a pair of 3/8×1" mortises on the top edge of the box back (A). (We cut the mortise outlines with an X-acto knife and removed the waste with a sharp 1/4" chisel.)

2 With a Forstner bit, drill a 1" hole 1/8" deep on the bottom side of the lid where shown on the Hole Detail accompanying the Exploded-View Drawing.

3 Using a plug cutter or bandsaw, cut a 1"-diameter plug from 1/8" stock. Glue the plug into the recess noting the grain direction shown on the Exploded-View Drawing. Sand the bottom surface flush with the bottom of the lid.

Assemble the two trays

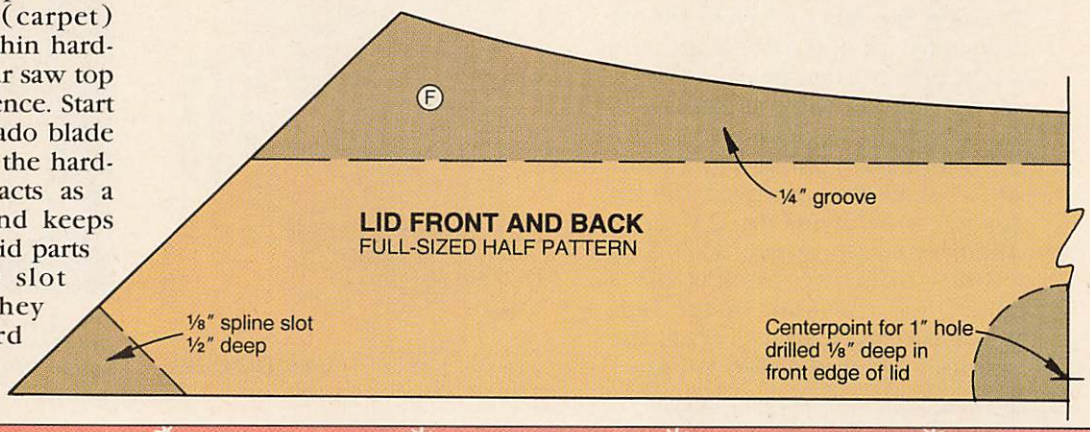
1 Cut the tray pieces (I thru P) to size. Mark the locations and cut 1/8" kerfs in parts L, M, and P where shown on the Tray Drawings. (We raised our tablesaw blade 5/16" above the saw table and used a miter gauge with an auxiliary fence to cut the kerfs.)

2 Cut 1/4" rabbets 1/8" deep along the *ends* of parts J and N. Form 3/16" rabbets 1/8" deep along the *bottom* edge of parts I, J, and N.

3 Cut the tray bottoms (K, O) to size from 1/8" hardboard.

4 Glue each divider assembly (L/M and L/P). Then, glue together each tray, checking for square.

5 Hand-sand the trays and divider assemblies smooth. Glue the dividers in place in each tray.



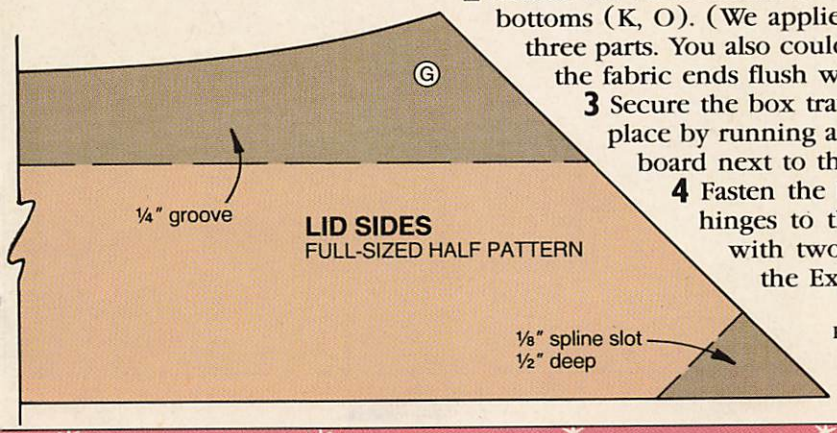
Apply the finish, and fit the fabric

1 Finish-sand the box, lid, and trays (we sanded with 150- and 220-grit sandpaper). Apply a stain if desired (we wiped on Pratt & Lambert light oak S27 stain). Add the finish. (We sprayed on several light coats of finish. We found this easier than trying to apply the finish with a brush.)

2 Adhere the velour fabric to the top surface of the box bottom (C) and tray bottoms (K, O). (We applied spray-on adhesive to the top surface of all three parts. You also could use carpet tape.) With an X-acto knife, trim the fabric ends flush with the bottom surface of the hardboard.

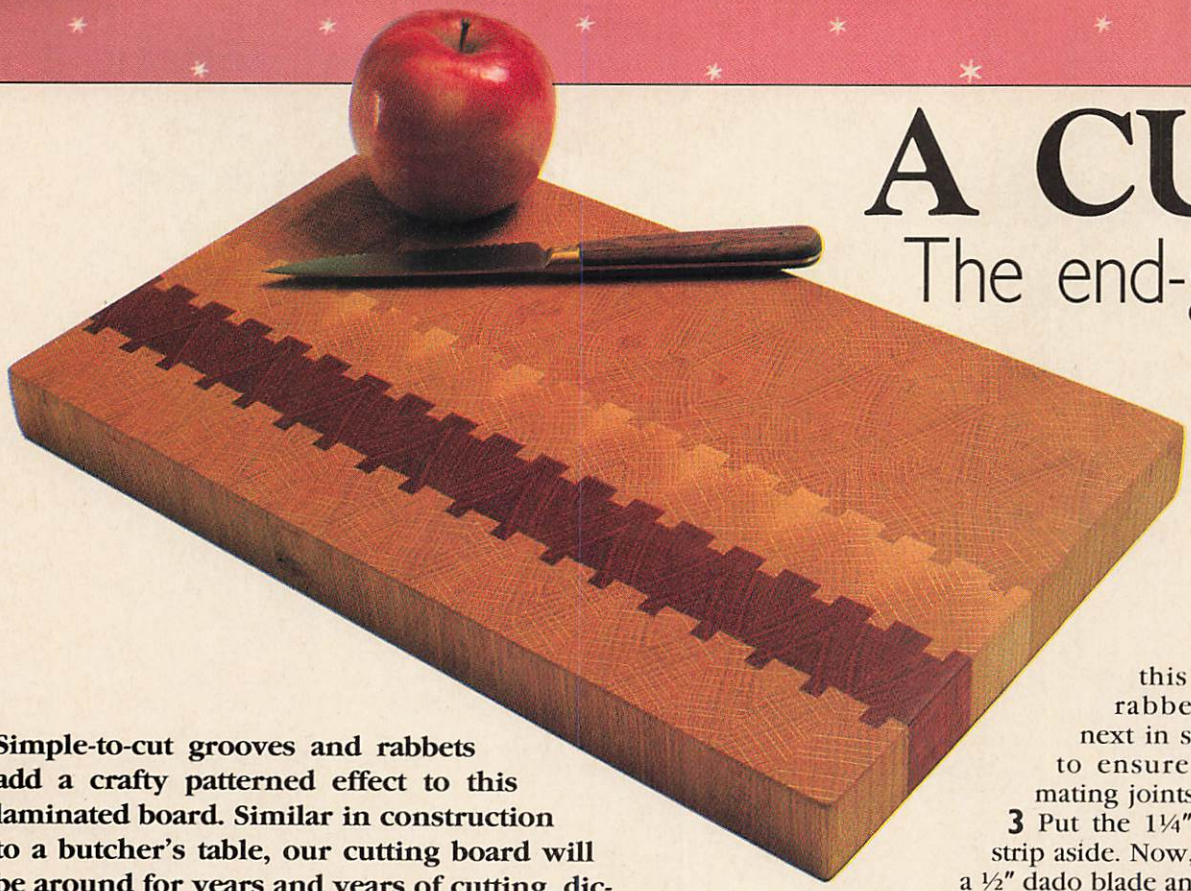
3 Secure the box tray bottoms in place. (We held the bottoms in place by running a fine bead of glue along the ends of the hardboard next to the bottom edges of the rabbets.)

4 Fasten the brass hinges to the box, and then screw the hinges to the lid. Add a 5½" length of necklace chain with two brads to the lid and box where shown on the Exploded-View Drawing.



Produced by Marlen Kemmet
Project Design: Daryl Morgan
Photographs: John Hetherington
Illustrations: Kim Downing; Bill Zaun

A CUT
The end-grain



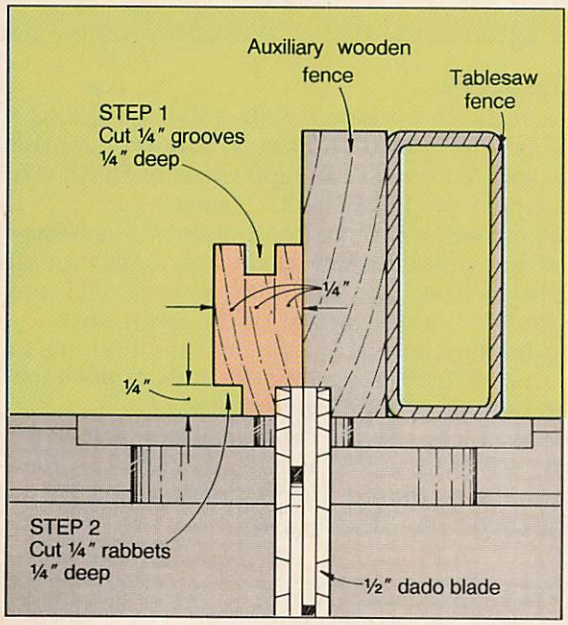
Simple-to-cut grooves and rabbets add a crafty patterned effect to this laminated board. Similar in construction to a butcher's table, our cutting board will be around for years and years of cutting, dicing, and mincing.

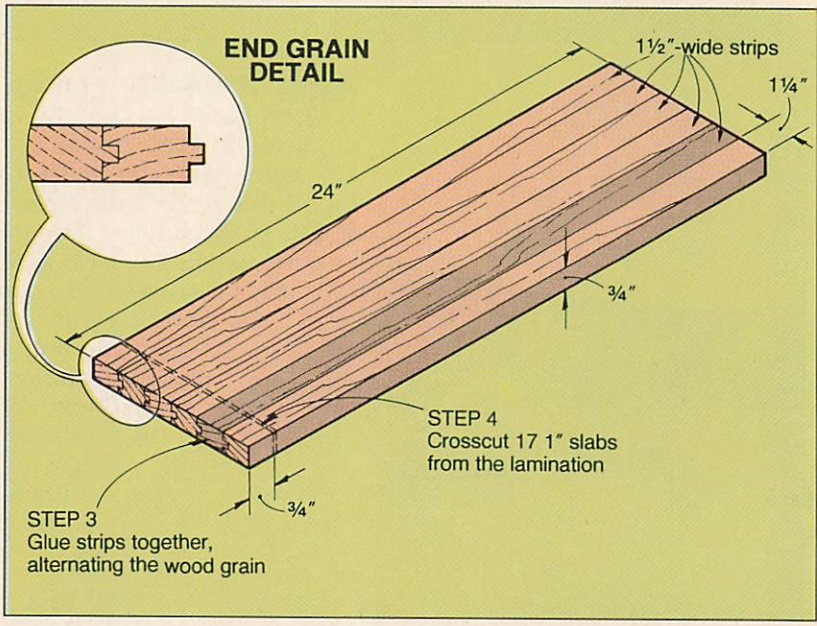
1 From ¾"-thick stock, rip and crosscut four strips of oak and one strip of a darker-colored hardwood (we used padauk; walnut also would work) to 1½" wide by 24" long. Cut a fifth oak strip to 1¼" wide by 24" long.

2 Attach an auxiliary fence and a ¼" dado blade to your tablesaw. Follow Step 1 of the drawing *below* to cut ¼" grooves ¼" deep *centered* along one edge of all the strips except *one* of the 1½"-wide oak strips. (We cut the grooves in this step and rabbets in the next in scrap stock to ensure gap-free mating joints.)

3 Put the 1¼"-wide oak strip aside. Now, switch to a ½" dado blade and use Step 2 of the drawing as a reference to cut a pair of ¼" rabbets ¼" deep along the opposite edge of the five 1½"-wide strips.

4 Spread glue on the mating edges of the six strips (we used yellow woodworker's glue). Clamp the strips, alternating the direction of the grain, in the configuration shown on Step 3 and





ABOVE THE REST

cutting board makes one striking gift

accompanying End Grain Detail. For ease in gluing and clamping the individual slabs later, check that the lamination is flat; reclamp if necessary. Leave the strips clamped overnight.

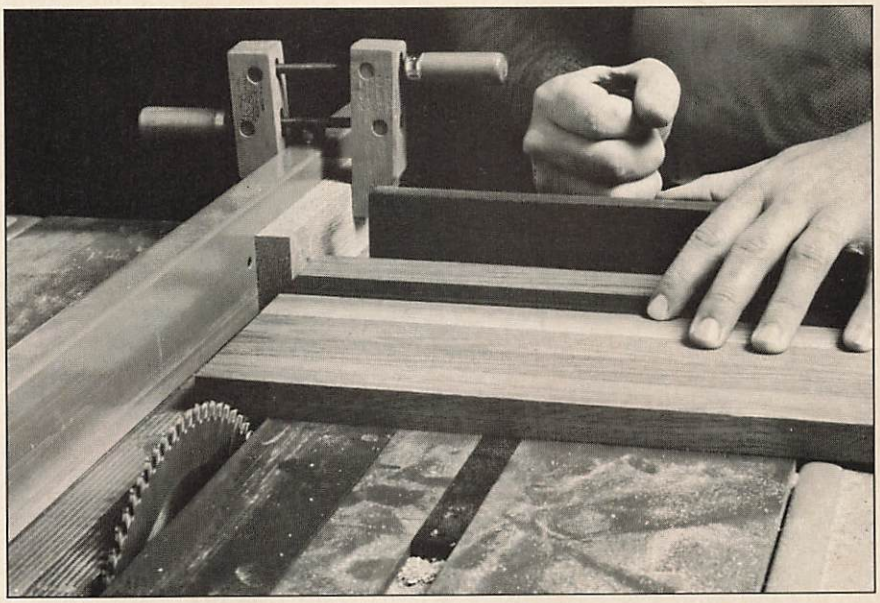
5 Remove the clamps and scrape off the excess glue. Carefully belt-sand or scrape both surfaces flat. (We used the edge of a framing square to check for flatness.)

6 Crosscut the lamination into 17 1"-long slabs where shown in Step 4 of the drawing. (As shown in the photo at *right*, we clamped a stop to our tablesaw fence, and then positioned the inside edge of the blade 1" from the outside surface of the stop.)

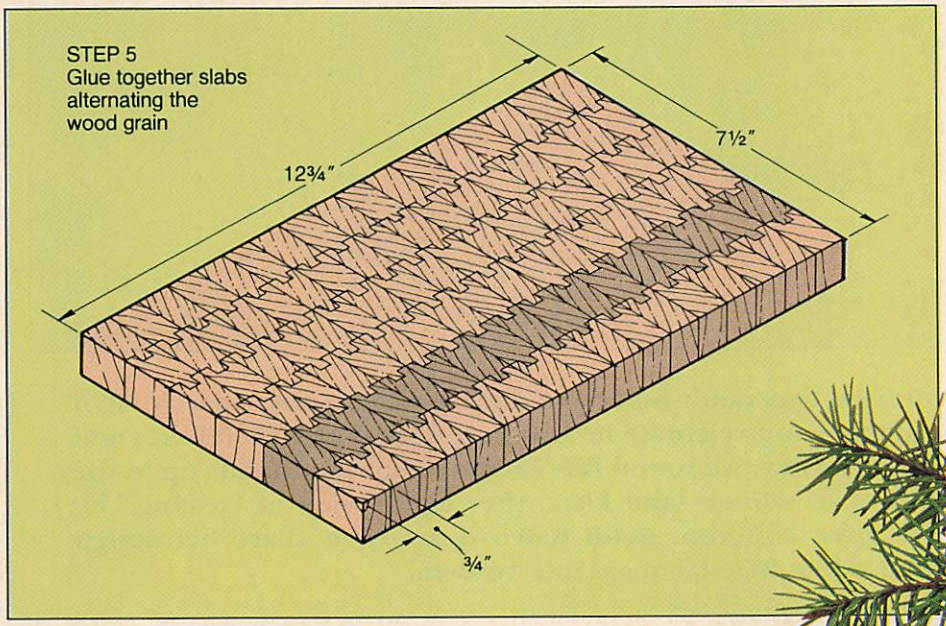
7 Position the pieces next to each other in the order they were cut. Then, flip every other piece to obtain the V-shaped grain configuration shown on Step 5 of the drawing and the project photo.

8 With the surfaces and ends flush, glue and clamp the slabs with the end grain facing up (we used bar clamps). Again, let the lamination sit overnight before removing the clamps.

9 Sand the cutting board smooth and apply the finish. (We used Behlen's Salad Bowl Finish; a vegetable oil or mineral oil also would work, but we found that several coats of Behlen's completely fills the open-grained oak.)



Clamp a scrap block to your rip fence for use as a stop to ensure equal-length pieces. The guard was removed for photo clarity.



Buying Guide

• **Behlen's Salad Bowl Finish.** Safe for wooden bowls, plates, and eating utensils. One pint, $9 ppd. ($12 U.S. funds for Canadian orders), catalog no. 85006. Armor Products, Box 445, East Northport, NY 11731.

Project Design: James R. Downing
Photographs: Hopkins Associates; Bob Calmer
Illustrations: Jamie Downing; Bill Zaun

Oh what fun it is to ride our Snow-loving

Minnesotans don't hibernate during winter; they march right outdoors and celebrate it. And in the Land of 10,000 Lakes and a lot of snow, we found this classic sleigh that stands up to the abuses of winter—and kids. After eight years of "testing" by his three children, Keith Raivo is ready to share his design with other *WOOD*® magazine readers.

open sleigh

First, laminate the runners

1 From ¾″ particleboard or plywood, construct a bending form like the one dimensioned on the Bending Form Drawing.

2 From straight-grained 1 1/16″-thick oak, rip 12 strips (this includes two extra strips in case of breakage) ⅛″ thick by 52″ long for the runners (A). The pieces are cut long and trimmed to length later.

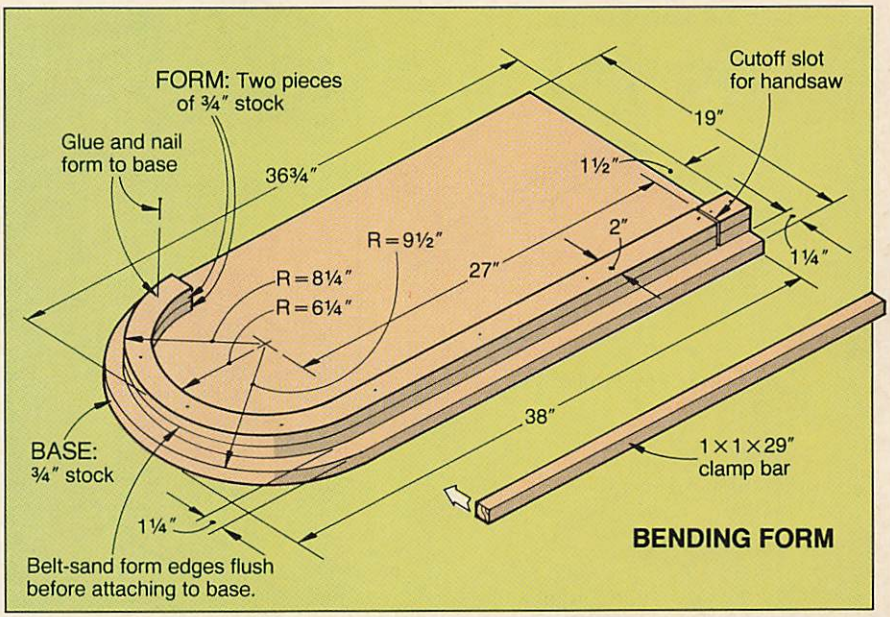
3 Cover the form with waxed paper to prevent the strips from sticking (see the photo at *right* for reference). Then, cut a 1×1″ scrap clamp bar 29″ long.

4 Spread glue on the mating surfaces of five runner strips. For joints that will stand up to the extremes of Mother Nature, use either slow-set epoxy or resorcinol glue. Place the 52″-long strips against the form and flush with the straight end of the form. Then, position the clamp bar on the outside edge of the strips. Starting at the end with the cutoff slot, clamp the strips to the form, keeping the edges flush as shown in the photo at *right*. Let the lamination sit overnight.

5 Cut the tail end of the laminated runner to length with a backsaw, using the cut-off slot in the bending form. Remove the clamps and clamp bar. Repeat the process to make a second runner.

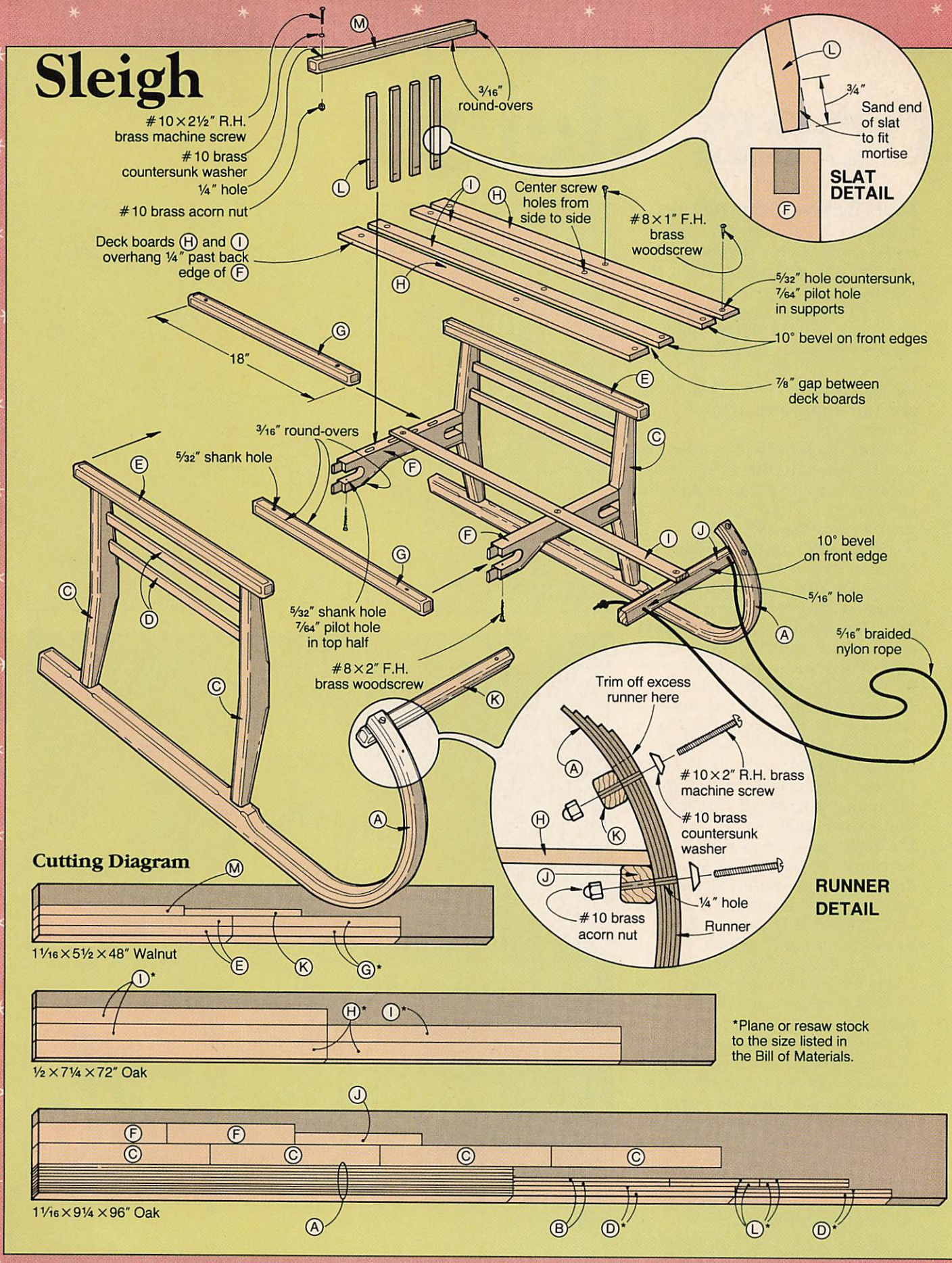
6 Scrape the squeeze-out from the edges of each runner and then sand the edges smooth. Cut the runner caps (B) to the size stated in the Bill of Materials. Glue and clamp one of them to each laminated runner, with the edges and tail ends flush. Later, cut or sand a slight curve on the top front edge of the runner cap where shown on the Runner Detail accompanying the Side Assembly Drawing. Rout 3/16″ round-overs along the edges of each runner.

Continued



Starting at the straight end, clamp five ⅛″-thick oak strips to the bending form to laminate the runner.

Sleigh


#10×2½" R.H. brass machine screw
#10 brass countersunk washer
¼" hole
#10 brass acorn nut
3/16" round-overs
Deck boards (H) and (I) overhang ¼" past back edge of (F)
Center screw holes from side to side
#8×1" F.H. brass woodscrew
5/32" hole countersunk, 7/64" pilot hole in supports
10° bevel on front edges
7/8" gap between deck boards
18"
3/16" round-overs
5/32" shank hole
5/32" shank hole 7/64" pilot hole in top half
#8×2" F.H. brass woodscrew
10° bevel on front edge
5/16" hole
5/16" braided nylon rope
3/4"
Sand end of slat to fit mortise
SLAT DETAIL
Trim off excess runner here
#10×2" R.H. brass machine screw
#10 brass countersunk washer
¼" hole
#10 brass acorn nut
Runner
RUNNER DETAIL
Cutting Diagram
1 1/16×5½×48" Walnut
½×7¼×72" Oak
1 1/16×9¼×96" Oak
*Plane or resaw stock to the size listed in the Bill of Materials.

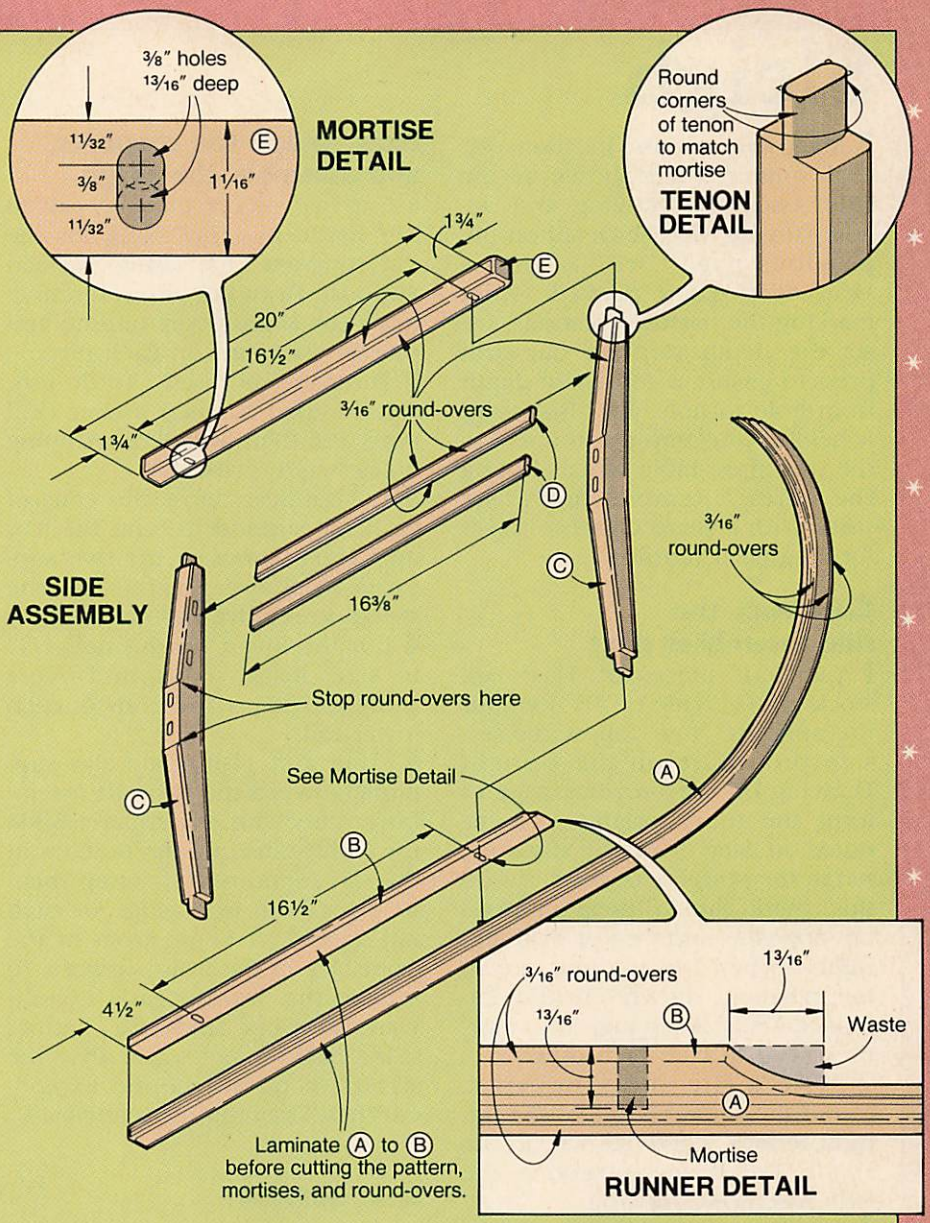
Bill of Materials

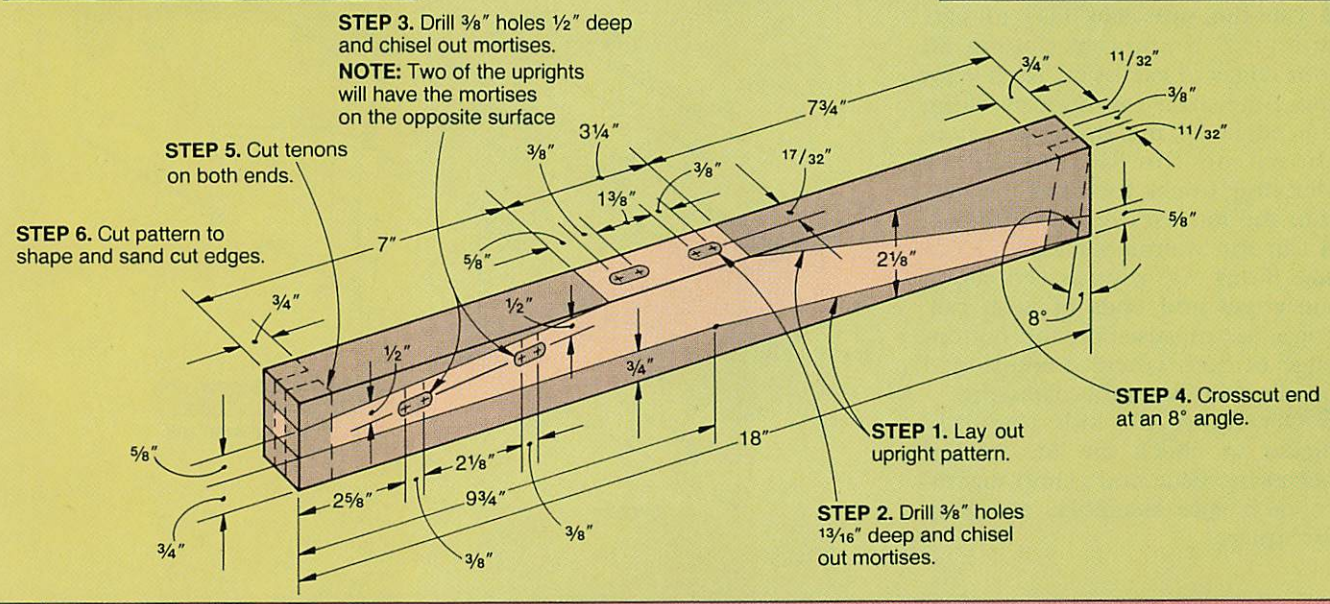
Parts		Finished Size*			Matl.	Qty.
		T	W	L		
A*	runners	5/8"	1 1/16"	48"	LO	2
B	runner caps	1/2"	1 1/16"	23 1/2"	O	2
C	uprights	1 1/16"	2 1/8"	18"	O	4
D	side slats	3/8"	3/4"	16 3/8"	O	4
E	rails	1 1/16"	1 1/16"	20"	W	2
F	slat supports	1 1/16"	2 1/2"	13 1/2"	O	2
G	rails	1"	1"	18"	W	2
H	deck boards	3/8"	2"	31 3/4"	O	2
I	deck boards	3/8"	1 1/2"	31 3/4"	O	3
J	support	1 1/16"	1 1/16"	13 1/2"	O	1
K	support	3/4"	1 1/16"	12 1/2"	W	1
L	backrest slats	3/8"	3/4"	9 1/4"	O	4
M	backrest rail	1 1/16"	1 1/16"	15 1/2"	W	1

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: LO-laminated oak, O-oak, W-walnut

Supplies: waxed paper, #8×1" flathead brass wood screws, #8×2" flathead brass wood screws, #10×2" roundhead brass machine screws, #10×2 1/2" roundhead brass machine screws, #10 brass countersunk washers, #10 brass acorn nuts, clear exterior finish, 5/16" braided nylon rope 6' long.





Sleigh

7 Mark the mortise locations on each runner where shown on the Side Assembly Drawing and accompanying Mortise Detail on the previous page. Drill ⅜" holes 13/16" deep where marked. (After marking the mortise locations, we set the depth stop on our drill press to ensure a consistent depth from hole to hole. We also found it helpful to clamp the runners to the drill press-table when drilling the holes.) Remove the waste stock with a sharp chisel to finish forming each mortise.

Construct the side assemblies next

1 Cut four pieces of 1 1/16" oak stock to 2⅛" wide by 18" long for the uprights. Now, follow the six-step procedure on the Upright Drawing on the previous page to form the four uprights (C). As noted in Step 3 of the drawing, *make the uprights in pairs.* To do this, mark the ½"-deep mortises on opposite surfaces of two uprights—when the uprights are in the position shown on the Exploded-View Drawing, the mortises need to face each other.

2 With a file and sandpaper, round the square edges of the upright tenons where shown on the Tenon Detail accompanying the Side Assembly Drawing.

3 Cut the side slats (D) to size. Rout 3/16" round-overs along all four edges of each slat. Then, rout the same-sized round-overs along the edges of the uprights where shown on the Side Assembly Drawing. Check the fit of the slats into the mortises in the uprights.

4 Cut the walnut top rails (E) to size. Rout 3/16" round-overs along the edges and ends of each rail. Form the mortises on the bottom edge of each where dimensioned on the Side Assembly Drawing.

5 Dry-clamp the side-assembly pieces to check the fit. Trim if necessary. Glue and clamp together each side assembly, checking for square.

Now, shape the supports, and assemble the sleigh

1 Cut two pieces of 1 1/16" oak to 2½" wide by 13½" long for the slat supports (F). Using the Slat Support Drawing for reference, mark the slat-support outline and mortise locations on each piece.

2 Form the mortises. (To do this, we clamped a fence to our drill press and then drilled overlapping holes where marked.)

3 Cut rabbets across the ends of each slat support to form the tenons. Then, bandsaw the two supports to shape. Drum-sand the pieces to remove the saw marks.

4 Cut the lower walnut rails (G) to size. Rout 3/16" round-overs along the edges and ends of each lower rail.

5 Glue and clamp the slat supports between the two side assemblies, checking for square. Slide the lower rails into the notches in the slat supports and clamp them in place. The front edge of each rail should sit ¼" in front of the front face of the front support. To secure the walnut rails (you'll want to work from the bottom side), drill the holes and drive the screws in place (see the Exploded-View Drawing for reference).

It's time to add the deck boards

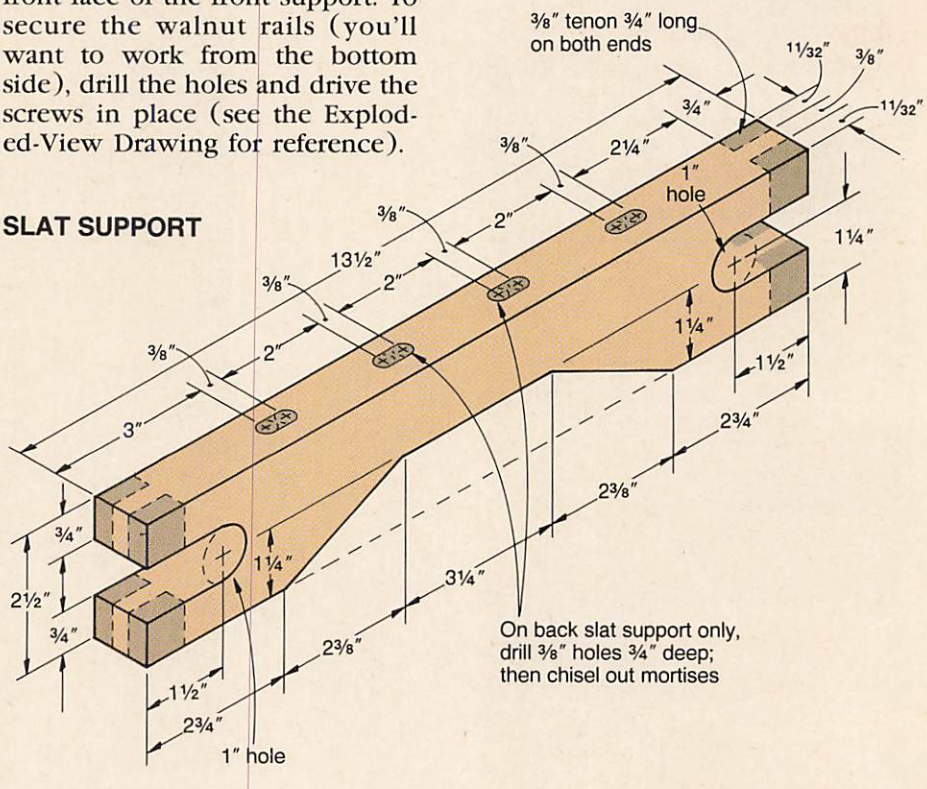
1 Cut the deck boards (H, I) to size, beveling the front ends at 10°. Cut the front deck-board support (J) to size, bevel-ripping the front edge at 10° where shown on the Exploded-View Drawing.

2 Rout or sand a ⅛" round-over along the edges (but not the ends) of each deck board. Switch bits, and rout 3/16" round-overs on the deck-board support (J).

3 Locate and mark the center of each deck-board support. Then, drill the holes and fasten the deck boards to the deck-board supports, starting with the center deck board and working outward. See the Exploded-View Drawing for reference. From outside edge to outside edge, the total width of the deck should equal 12".

4 Position the assembly on the sleigh. Then, mark the location and fasten the deck boards to the supports (F).

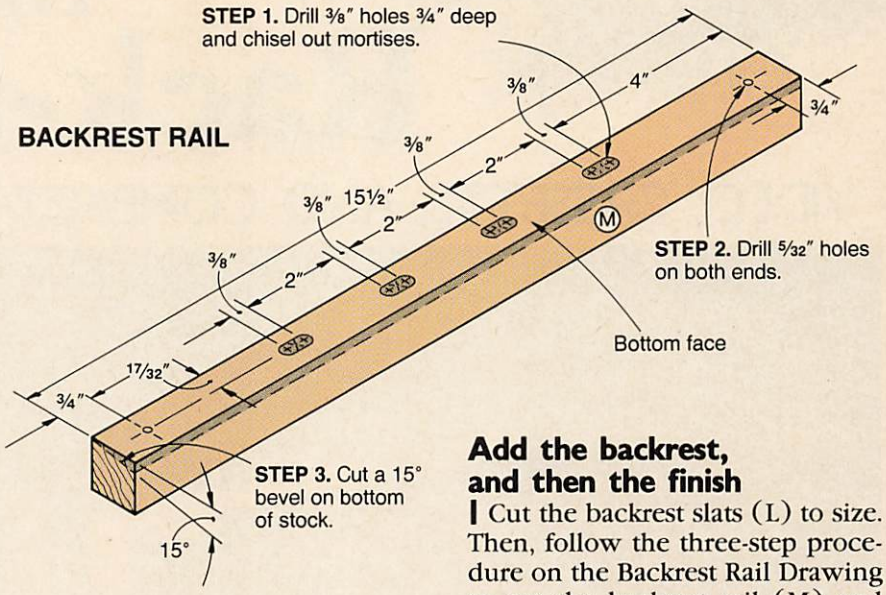
SLAT SUPPORT

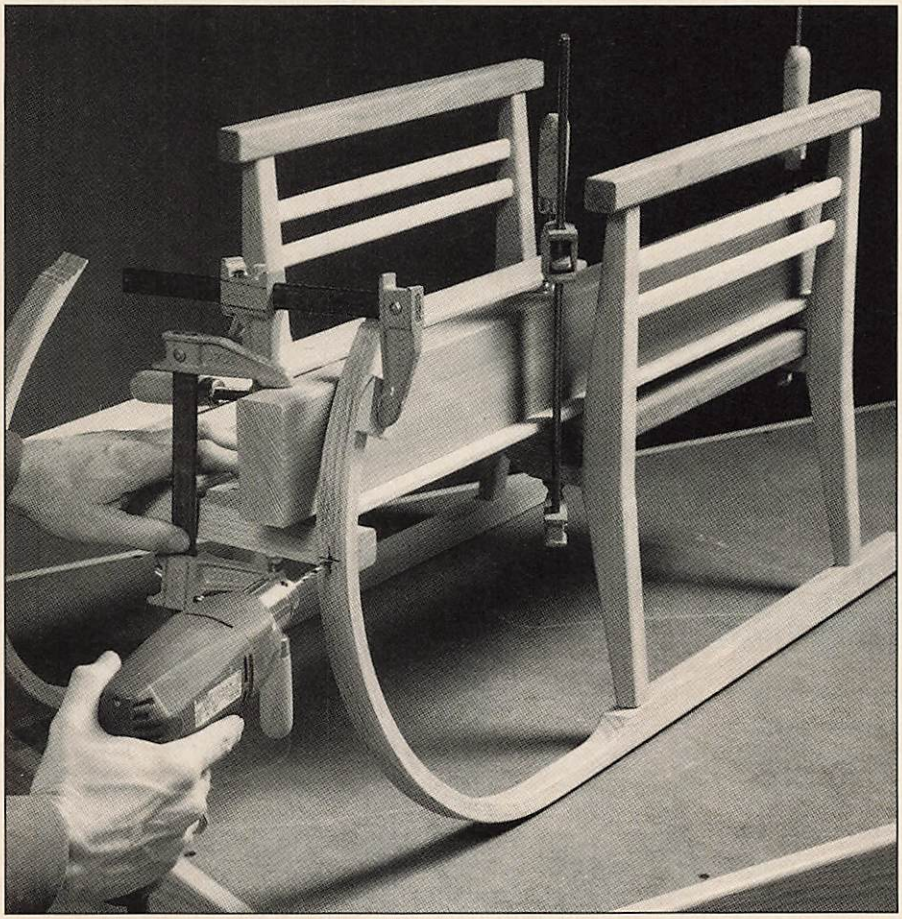


5 Clamp a 2×4 to an outside deck board where shown in the photo *below*. (The 2×4 keeps the deck board straight.) Using the Runner Detail accompanying the Exploded-View Drawing for reference, drill the holes and screw the runner to the deck-board support (J). (To prevent the acorn nuts from working loose over time, we put a drop of epoxy in each nut before mating it with the machine screw.) Move the 2×4 to the other outside deck board and repeat the process.

6 Cut the top support (K) to size. Drill the holes and fasten it to the runners where shown on the Runner Detail.

7 With a fine-toothed saw, trim the top of each runner flush with the top of the runner support.





Mark the centerpoint and drill a hole for fastening the deck-board support to the laminated runner. The 2×4 helps keep the deck boards flat.

Add the backrest, and then the finish

1 Cut the backrest slats (L) to size. Then, follow the three-step procedure on the Backrest Rail Drawing to cut the backrest rail (M) and locate and form its mortises.

2 Sand the bottom front end of the slats to fit into the mortises in the rear support (F). See the Slat Detail accompanying the Exploded-View Drawing for reference.

3 Glue the backrest slats into the mortises in the rear support (F). Now, fit the backrest rail (M) onto the top of the slats. Drill the holes and fasten the backrest rail to the top ends of the top rails.

4 Drill a pair of 5/16" holes in the deck-board support (J) where shown on the Exploded-View Drawing to accept the pull rope.

5 Sand the sleigh. Apply the finish (we used three coats of clear exterior polyurethane, steel-wooling between coats). Add the braided nylon rope. Apply paraffin or ski wax to the bottom of the runners for added ease in sliding.

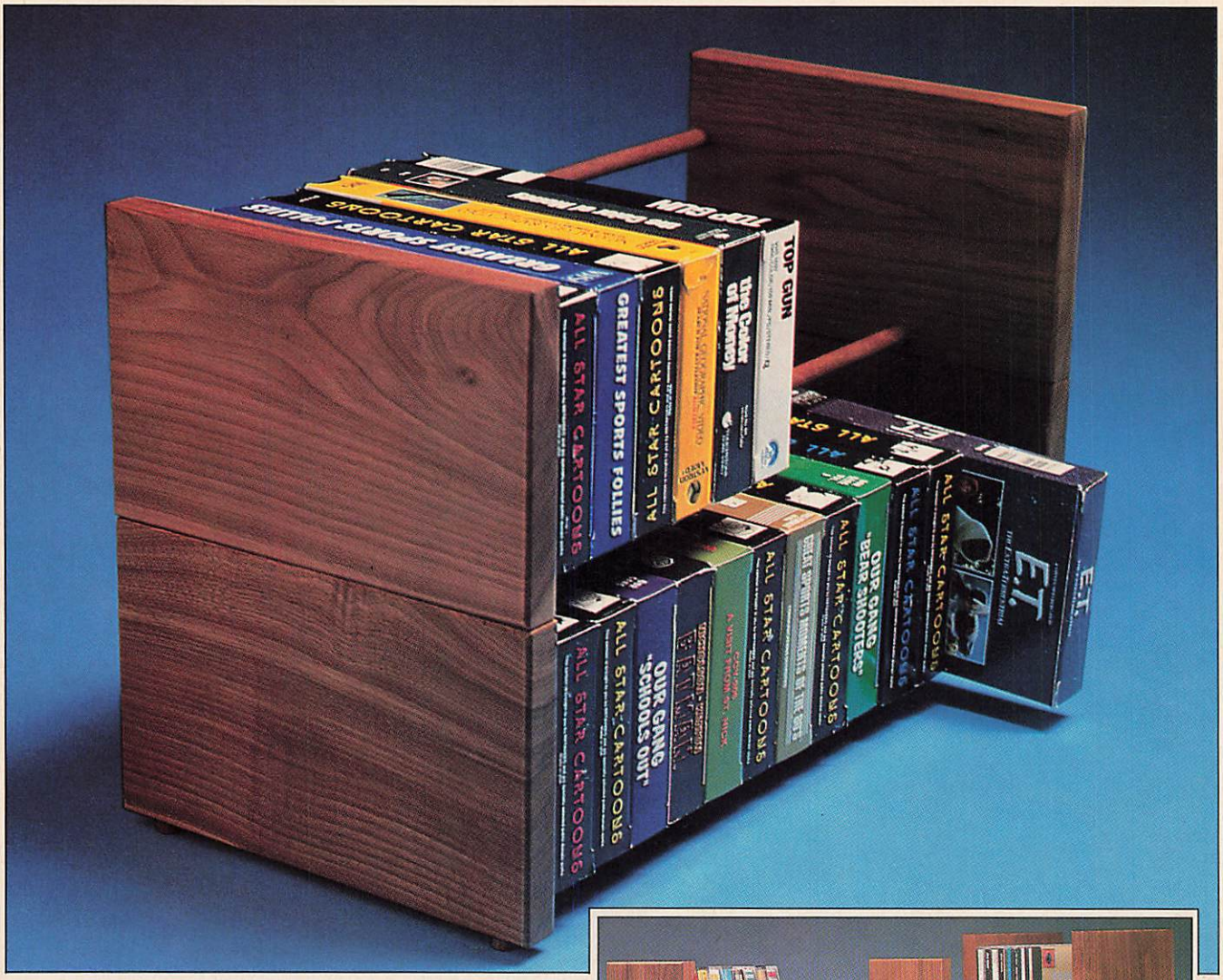
Buying Guide

• **Slow-set epoxy.** One 8-oz. bottle of resin and one 8-oz. bottle of hardener, catalog no. WM30, $18 ppd. System Three Resins, P.O. Box 70436, Seattle, WA 98107.

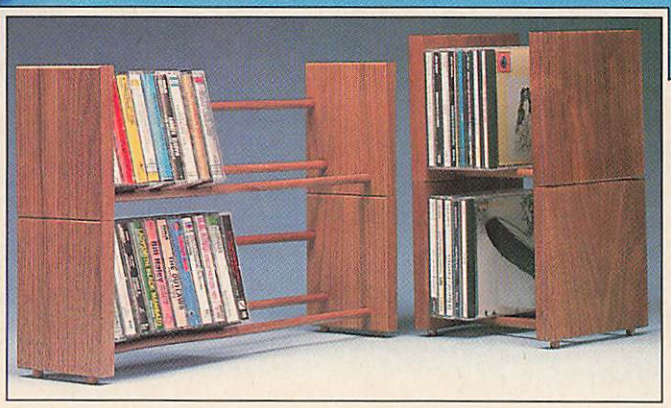
Produced by Marlen Kemmet
Project Design: Keith Raivo Designs, Brook Park, Minnesota
Photographs: John Hetherington; Hopkins Associates
Illustrations: Kim Downing; Mike Henry

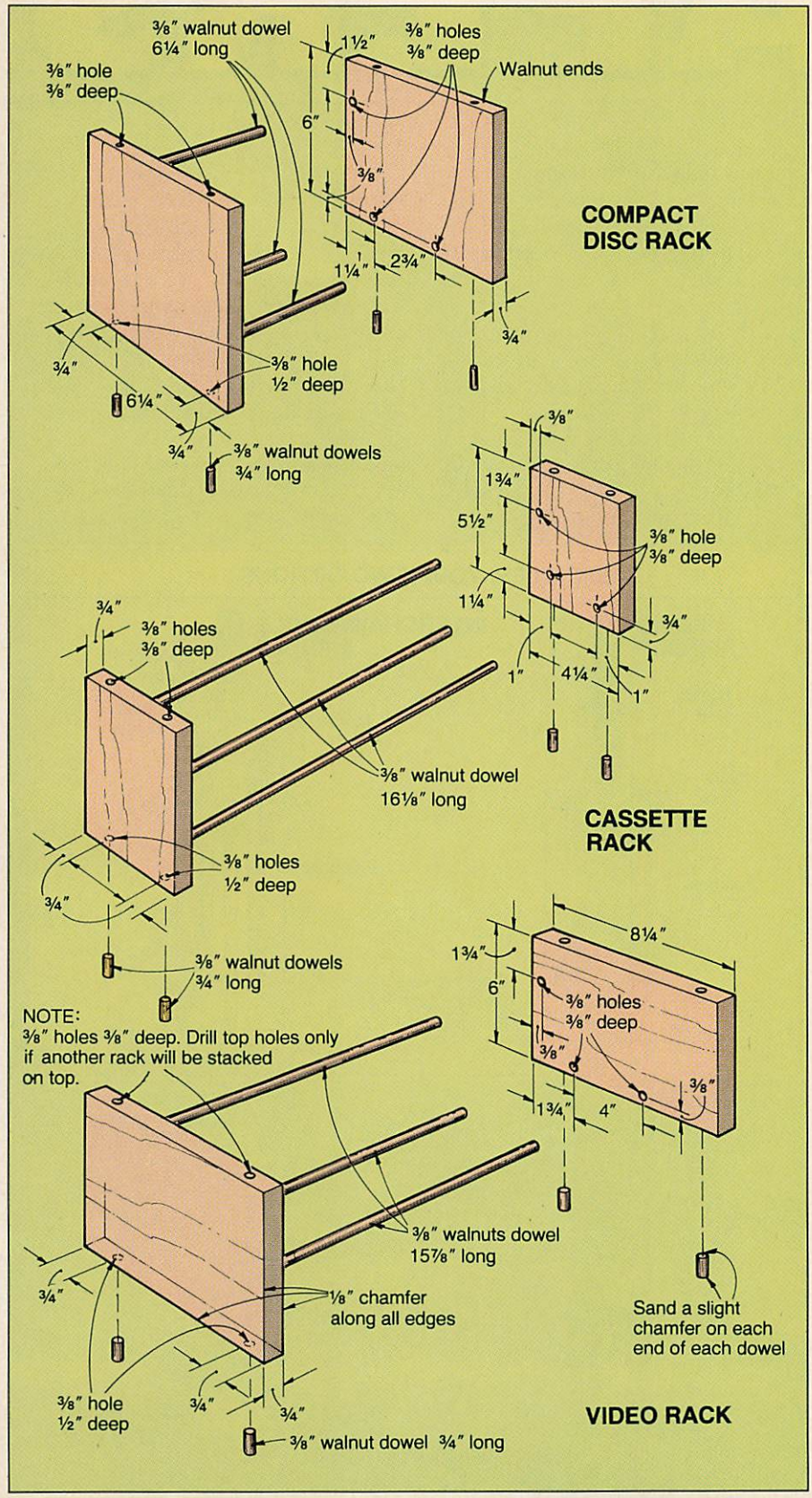
The Three Rack-a-tiers

VIDEO, CASSETTE, AND COMPACT-DISC ORGANIZERS



It's time for those tapes and discs to come out from behind the couch and under the coffee table. Here's a trio of simple solutions to keep your collection organized and tastefully displayed. Stack one rack on top of the other to increase your storage space as your collection grows. Or, if you're just starting out, build a single organizer now and construct more as you need them.





***Note:** The following instructions are for the video rack shown below left. To build the cassette or compact-disc rack, refer to the drawings for each and to the note concerning the hole locations on the drawings.*

1 From 3/4"-thick stock (we used walnut), cut the rack ends to 6" wide by 8 1/4" long. When cutting the ends to size, note the grain direction shown in the photo on the opposite page.

2 Mark the hole centerpoints on the inside face of each endpiece. (We put the surface with the nicest grain pattern on the outside.) An easy way to ensure your holes align is to mark and drill the holes in one endpiece, and then use dowel centers to transfer the hole locations to the other endpiece.

3 If you plan to stack the units as shown on the opposite page, mark the hole locations on the top and bottom edges where dimensioned on the drawing. Don't drill holes in the top edge of the uppermost unit. Rout or sand a 1/8" chamfer along all edges.

4 Drill 3/8" holes 3/8" deep at each marked centerpoint on the inside faces and 1/2" deep in the bottom and top edges where marked.

5 Using a stop for consistent lengths, cut three pieces of 3/8" walnut dowel to length for each rack. Sand a chamfer on each end of each dowel. Glue the dowels between the endpieces. (To avoid wobble in the finished rack, we clamped the endpieces to a flat surface so the bottom edges were level with each other.)

6 Cut 3/4"-long pieces of 3/8" dowel for the connecting dowels and feet. (To make your own dowels, see page 30.) Sand a chamfer on both ends of each dowel. Glue the dowels into the bottom edge (they slide into the holes in the top edge of the mating endpiece). Apply a clear finish.

Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun

SHAPERS

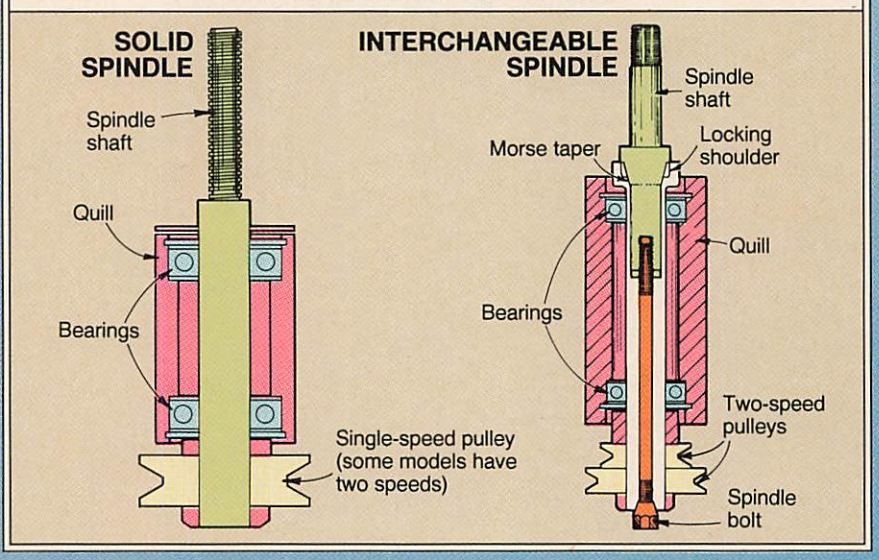
Like most cabinetmakers, *WOOD*® magazine's chief tool consultant, George Granseth, swears by his three shapers—he couldn't stay in business without them. So, when George suggested that many of you readers might step up from a router table to one of these heavy-duty tools, we said, "OK, prove it." Not one to back away from a challenge, our tool wizard set about testing seven popular models and keeping track of each machine's performance. Here's what we found out.

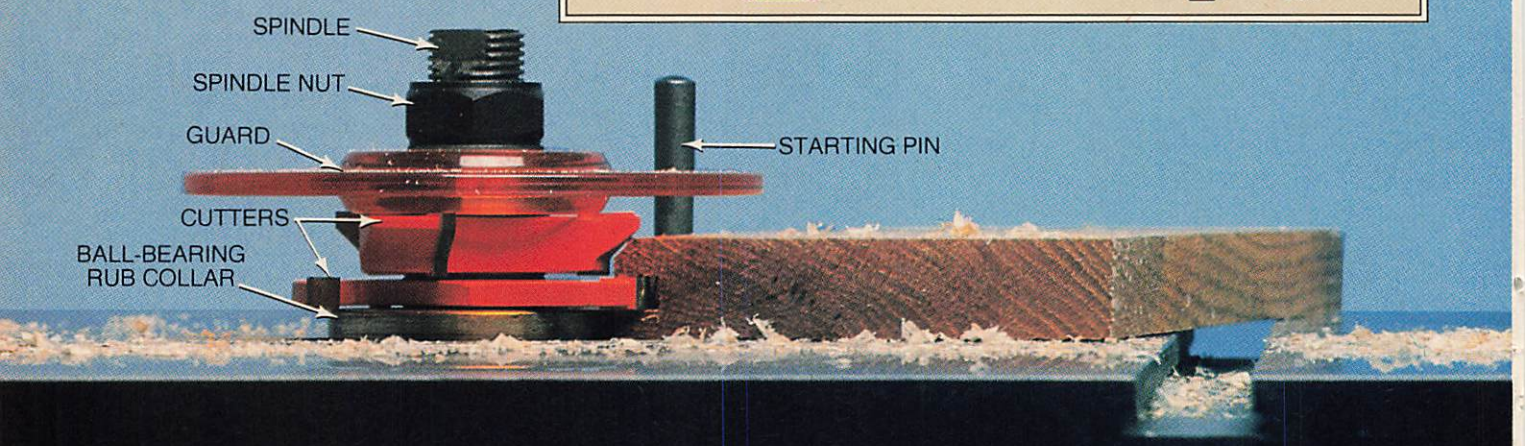
How a shaper works

In many ways, a shaper resembles a crossbreed between a tablesaw and a router table. Similar to the saw, a shaper has a flat, heavy-duty table with a miter-gauge slot milled into it as shown in the photo *below*. You can make heavy cuts with a shaper because it has a powerful induction motor just as a tablesaw does. Like a router setup, a rotating spindle sticks through a hole in the table and holds various cutters.

As shown in the drawings *below*, the **spindle shaft** rotates inside a **quill** that contains large, heavy-duty **ball bearings** near its top and bottom. Most machines accept **interchangeable spindles** of ½" and ¾" diameters, and a few big models accept 1" or larger spindles. Many interchangeable quills also accommodate router-bit collets. The **solid spindle** mechanisms found on some light-duty, single-speed machines, usually have either ½" or ¾" shafts.

SPINDLES: YOUR TWO OPTIONS





Machines that put muscle to the molding

You can raise or lower the spindle by as much as three inches on some larger shapers in one of two ways. As shown in the drawing *below*, most machines have a **movable quill/motor assembly** that raises or lowers as you turn the **up/down adjustment handwheel.** Some shapers have a simpler, **movable-quill-only** mechanism. With these, the motor remains stationary and the drive belt follows the up-and-down movement of the quill as it rides along a large **drum pulley** attached to the motor.

Is a shaper for you?

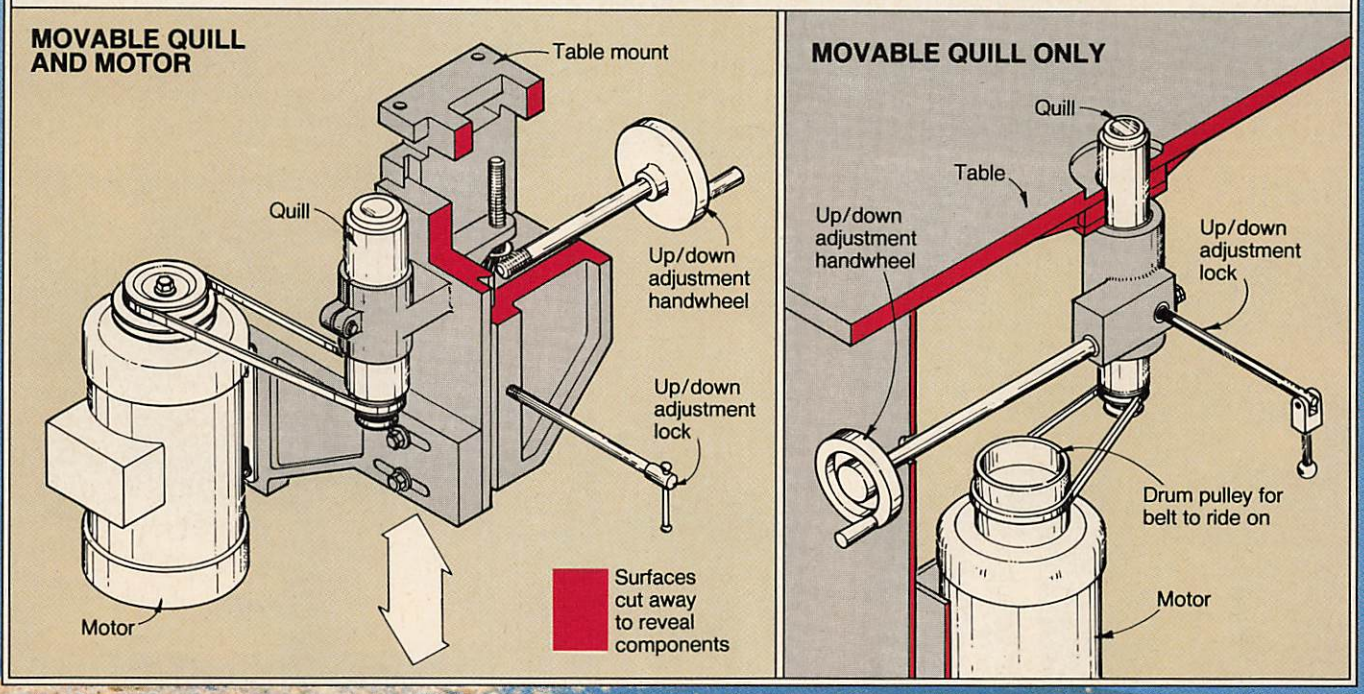
If you're planning a major cabinetry project, a shaper could pay for itself on that project alone. Why? Basically, a shaper picks up where a table-mounted router leaves off. Although routers work fine for edge details, template routing, and trimming, they don't have the necessary brawn for large-scale moldings, raised panels, long production runs, or any operation that removes hefty amounts of stock.

The muscle behind a shaper starts with its motor. Shapers have powerful, quiet, long-living induction motors that turn the spindle at between 7,000 and 10,000 rpm. In comparison, the high-pitched universal motors found in routers run at 20,000-plus rpm—way too fast for bits over 1½" in diameter. Although some variable-speed routers turn as slow as 8,000 rpm, they have no greater torque at slow speeds because manufacturers reduce their rpm electronically instead of mechanically through gears or pulleys.

And, a 3-hp router has a lot less torque than a 3-hp shaper even at high speeds because universal motors just can't deliver the power of a capacitor-start induction motor. With a shaper, the motor's muscle transfers to a sturdy spindle that's better able to handle heavy cuts because of its extra mass and thickness compared to a router-bit shank. George Granseth remembers seeing a ¾"-radius

Continued

SPINDLE-HEIGHT ADJUSTMENT MECHANISMS: 2 WAYS TO GO



rounding-over bit with a ½" shank bend under the stress of a cut through oak. Loss: $55. George has never seen that happen to a ¾" shaper spindle.

Finally, even the biggest routers don't have bearings as large as those found in small-shaper quills. Those big bearings, turning at slower speeds, last much longer than router bearings.

How much shaper do you need?

Once you decide to put down your hard-earned cash (anywhere from $450–$1,700) for a shaper, you're faced with lots of choices in size and capacity.

Spindle size: Most machines accept more than one spindle size, but make sure you buy one with a ¾" spindle. Manufacturers sell more cutters in this size than any other, and most home woodworkers can accomplish all of their work with ¾" cutters. Although you can buy bushings that will make ¾" cutters work on ½" spindles, you're better off with exact-fitting cutters and spindles. And remember, a ½" shaper spindle has no more rigidity than a ½" router-bit shank.

Of the machines we tested, the Taiwanese-made Sunhill SP-101 had bearings, quills, spindles, and router collets that were more massive than any other machine, as shown *below left*. The Sunhill machines, along with the Kity and Jet units, had one more thing in their favor: smooth spindle shafts. As shown *below*, most spindles have threaded shafts, but we prefer solid contact between cutters and smooth shafts.

Horsepower: All of the machines in our test (from 1 to 3 hp) had enough oomph to make even raised-panel cuts in one pass through red oak. But, we used fresh, out-of-the box cutters. As your cutters dull, you'll appreciate the extra muscle of the 2- and 3-hp models for heavy cuts. Buy a 1- or 1½-hp model if you don't mind making multiple-pass cuts now and then.

Also, remember that all of the 3-hp models, and some of the 2-hp models, require 220 volts. If you don't have this service, adding it will cost you a few dollars.

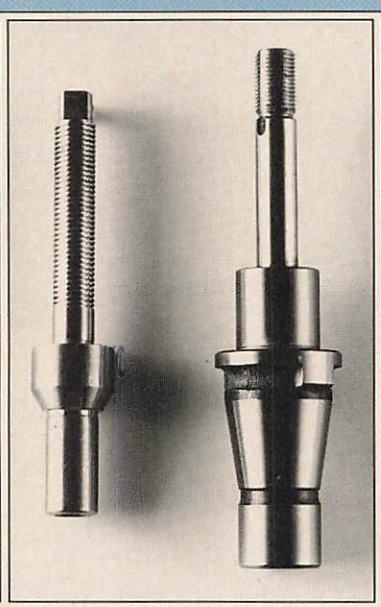
Table dimensions: Keeping the size of your workpieces in mind, buy a shaper with a table large enough to help you control your work. The chart on page 60 shows whether you can buy extensions for the standard table size.

While you're thinking about tables, also pay attention to the size and number of insert openings that come with the machine you're considering. Bigger openings accommodate larger-diameter cutters, and having several different sizes means you can choose an insert that provides for maximum table support just beyond the cutter tips.

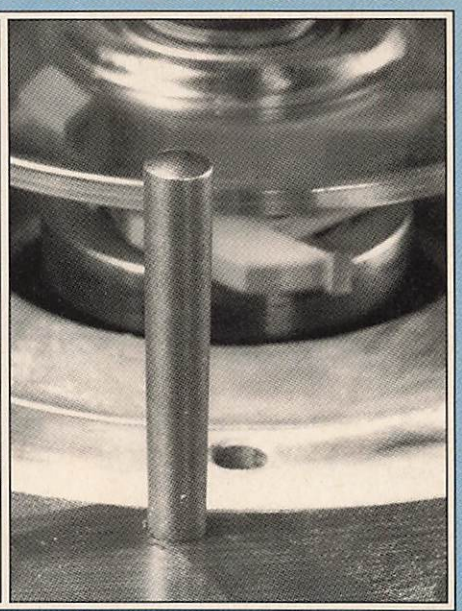
And, remember that starting pins come in handy for curved workpieces. Only the Delta 43-375 has both table and insert starting-pin holes as shown *below*.

Quill travel: Although most shapers have about 3" of quill travel, some of the smaller machines, such as the Powermatic 23 and Sears 23941, have only ⅞" of travel. Such limited movement shouldn't bother you if you don't mind spacing the cutters up and down with bushings.

Sunhill's quills, spindles (1¼" model at *left*) and router collets (½" model shown) were the heaviest such components in our test.



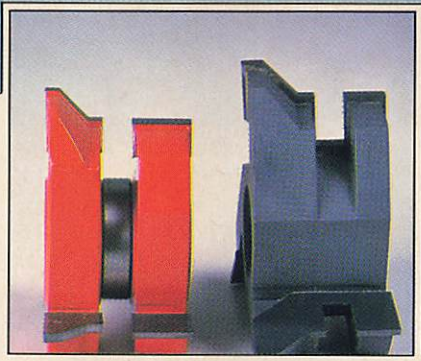
We prefer solid spindle shafts such as the one at *right* from the Sunhill SP-101.



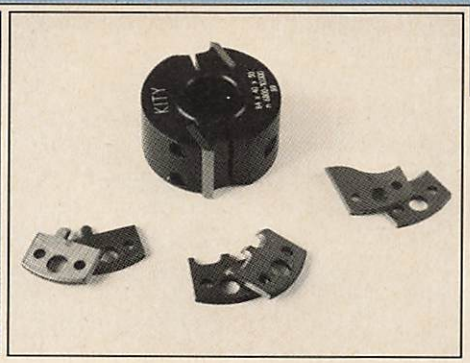
The Delta 43-375 has starter-pin holes in both the table and inserts—a handy accessory for curved workpieces.

Cutters: choices, choices

If you own a computer, you know that your investment in software can sometimes cost more than the basic machine. And as with computer programs, shaper cutters don't come cheap. So, it pays to make smart buys.



Freeborn's multi-piece V-groove cutter, *left*, and Grizzly's solid V-groover.



Kity's universal head has a ¾" bore and holds one of up to 40 different knives.

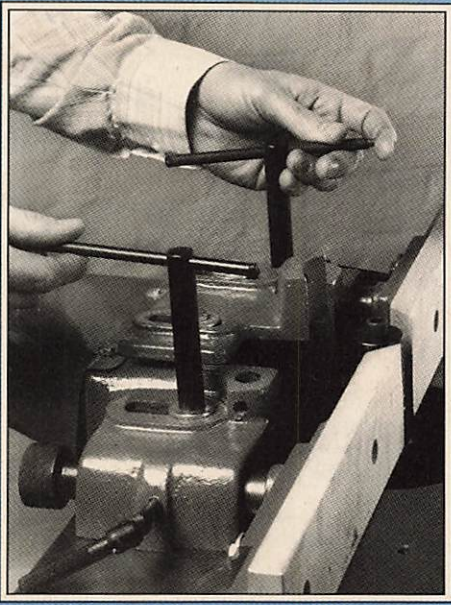
Carbide: Like saw blades, carbide-tipped shaper cutters stay sharp about 10 times longer than high-speed steel cutters, and have become the choice of most craftsmen. As shown in the photo at *top left* of two similar V-groove cutters, you can buy either multi-piece or solid cutters. The multi-piece sets offer greater versatility because you can switch around the individual cutters to achieve many different profiles. And, you can add bearings (called rub collars) between the cutters to expand their versatility.

We compared multi-piece sets made by the Freeborn Tool Company in Spokane, Washington, with solid, Taiwanese cutters from Grizzly Imports. Besides their greater versatility, the Freeborn cutters had thicker tips, providing for greater cutter life.

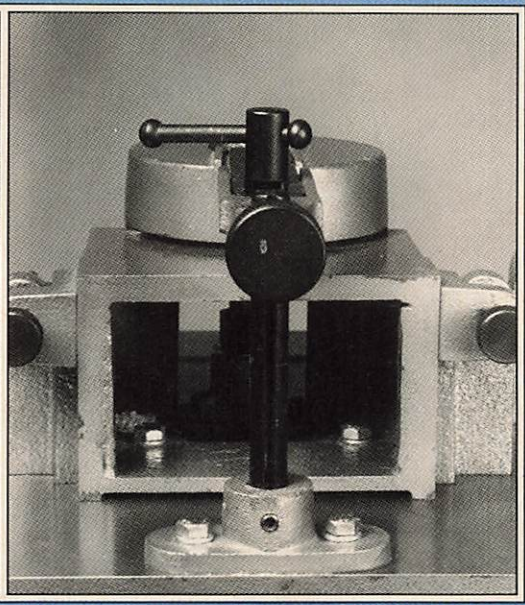
Although most professionals we've spoken to prefer Freeborn cutters, the choice may depend on your pocketbook: Freeborn cutters cost two to three times as much as imports. For example, one mail-order catalog charges about $100 for a Freeborn raised-panel cutter. Grizzly raised-panel cutters cost $49.95. Other major manufacturers and importers include DML, Delta, and Freud.

High-speed steel: You can't easily find solid steel cutters in a wide variety of profiles nowadays, unless you want to pay for custom-made cutters. But, you can buy cutter heads that hold interchangeable knives such as the set from Kity as shown at *top right*. The universal head costs $160 and a starter set of six patterns costs $140. These sets work fine, but have only small-profile knives.

Tangtung: Freeborn describes this material as being a cross between carbide and high-speed steel because it lasts as long as carbide and approaches the sharpness of high-speed steel. But, you shouldn't use Tangtung cutters in any material containing resins or glue lines. Why? The glue lines will wear grooves in the knives and the resins will prematurely dull the edges.



You can remove the fence on the Jet JWS-34-1 with a few turns of its convenient handles.



You'll need a wrench to loosen the fence and guard on the Grizzly G1035. Arrows point to mounting bolts.

More points to consider before making a purchase

Fences: We prefer simple fences that adjust quickly and accurately and that don't require wrenches. The Jet JWS-34-1 shown at *far left* and Kity 623 had tube-mounted fences that pass our "hassle-free" criteria. In no time at all, you can remove both of these fences by turning a set of handles.

Interestingly, the manufacturer of the Grizzly G1026 and G1035 shapers copied the design of the Powermatic 26 right down to some shortcomings in the fence. As shown at *near left*, the Grizzly machine requires a wrench for unbolting the fence and ring guard. Also, the ring guard's mounting rod blocks the rectangular dust chute, making dust collection a tricky task.

Continued

Sliding tables: This accessory will add several hundred dollars to the cost of your shaper, but it makes for smooth and safe end-grain cuts. The reason: Once you clamp your workpiece to the carriage, it can't lift or bind. Jet, Kity, and Sunhill sell sliding-table models for less than $2,000.

Speed changes: Of all the machines in our test, only the Kity 623 had three speeds, with a low-end speed of 5,500 rpm (1,500 rpm slower than other models we tested). We also found speed changes easier on this machine than any other. As shown *below right*, with the Kity you simply pull on a handle to loosen the belt and make a 10-second change.

Switches: Most shapers have two switches: ON/OFF and reversing. More expensive machines have magnetic ON/OFF switches that switch the machine OFF when a power interruption occurs.

Reversing switches change the rotation of the spindle from counter-clockwise (the normal direction for right-to-left feeding) to clockwise (for left-to-right feeding). You'll use reverse feeding whenever you need to invert a cutter on the spindle for a greater variety of cuts.

Only one machine in our test—the Kity 623—didn't have a reversing switch. This finding disappointed us because we liked everything else about the Kity machine. Jeff Farris, of Farris Machinery, Kity's sole U.S. importer, explained that Kity leaves the reversing switch off the machine to comply with European safety regulations. "Kity could have added a reversing switch for the U.S. market," Farris said, "but we feel few home woodworkers ever have need for reverse cuts."

If you don't feel you have need for a reversing switch, the Kity 623 may be just the machine you're looking for.

The final analysis: How the test models shape up

Under $500: Most home woodworkers will find that either the **Grizzly G1035** or **Powermatic 23** will meet their shaper needs. Both machines have standard ½" and ¾" spindles and accept router collets (the Powermatic takes only a ¼" collet—the G1035 accepts ¼" and ½" collets). The Grizzly has more power (1½ hp vs. 1 hp), and more spindle travel (3" vs. ⅞"); but the Powermatic has a simpler fence system, and a dealer network behind it.

Over $500: In this price range, we especially like the **Delta 43-375** and **Sunhill SP-101,** but for different reasons. The Delta has well-made components and user-friendly features throughout. And, if it matters to you, the 43-375 and the Sears 23941 are the only machines in our test made in the United States.

For the money ($1,295) no shaper topped Sunhill's SP-101 in terms of heavy-duty quills and spindles. It doesn't have starter-pin holes, but you could easily bore those yourself.

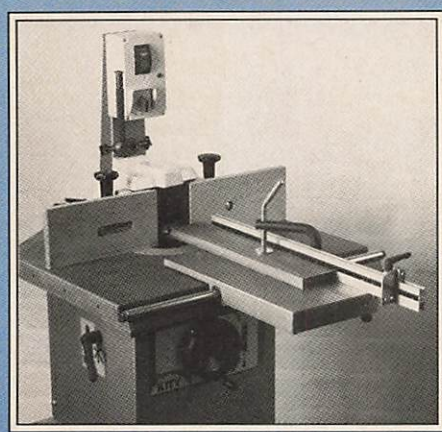
Written by Bill Krier
Technical consultant: George Granseth
Illustrations: Kim Downing; Bill Zaun
Photographs: John Hetherington; Bob Calmer

Manufacturer	Model No.[1]	Speeds (RPM)	DRIVE SYSTEM Type[2]
DELTA	43-375	7,000 10,000	MQM
GRIZZLY	G1035	7,000 10,000	MQM
	G1026	7,000 10,000	MQM
JET	JWS-34-1	8,000 10,000	MQM
	WSS-3-1	7,000 10,000	MQM
KITY	623	5,500 7,300 10,000	MQM
POWERMATIC	23*	9,000	MQ
	26	7,000 10,000	MQM
SEARS	23941** 23939***	9,000	MQ
SUNHILL	SP-101	7,500 10,000	MQ

N/A Not available
1. * Similar machines sold by most Taiwanese importers.
** Catalog number.
***Store number.

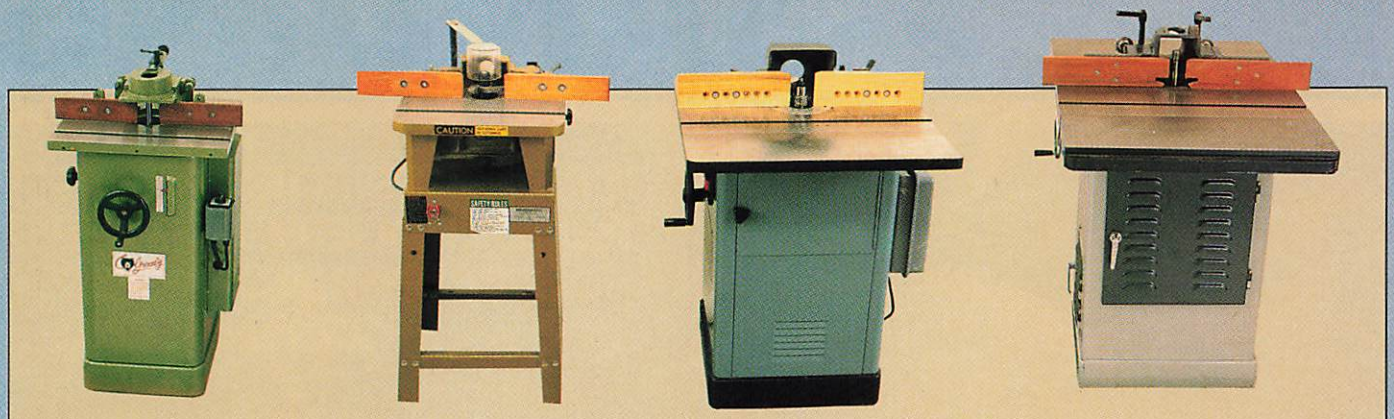
MANUFACTURERS LISTING:

Cascade
800-235-0272
DML
800-233-7297 or 502/587-5562



Kity's sliding table makes for safe cross-grain cuts. Jet and Sunhill also have sliding-table shapers under $2,000.

You can quickly switch between three speeds by means of a convenient handle on the Kity 623.



Grizzly 1035 | Powermatic 23 | Delta 43-375 | Sunhill SP-101

SIZING UP 10 POPULAR SHAPERS

	MOTOR						SPINDLES							TABLE[4]								
Horsepower	Voltage	Magnetic ON/OFF switch (Y, N)	Separate ON/OFF, reversing switches	Capacity under nut (1" spindle) (inches)	Capacity under nut (¼" spindle) (inches)	Standard sizes (inches)	Optional sizes (inches)	Router collets available[3]	Travel (inches)	Smooth (S) or threaded (T) shaft	Size without extensions (inches)	Size with one extension (inches)	Size with two extensions (inches)	Insert opening diameters (inches)	Starting-pin holes in inserts (Y, N)	Starting-pin holes in table (Y, N)	Country of origin[5]	Weight (pounds)	List price	Selling price[6]
3	220	Y	Y	4	3¼	½, ¾	1	Y	3	T	20x27	28x27#	36x27	6¾, 3½, 3, 1⅜	Y	Y	US	375	$2,195	$1,600
1½	110/220	N	N	N/A	2¾	½, ¾	N/A	Y	3	T	20x18#	20x28	N/A	5, 3½, 1¼	Y	N	T	300	N/A	495
3	220	Y	Y	2½	2¾	½, ¾, 1	N/A	Y	3	T	N/A	28⅞x28#	N/A	5½, 4, 2¾, 1¾	Y	N	T	420	N/A	850
2	110/220	Y	Y	1¾	1¾	¾, 1	½	Y#	3	S	19¾x19¾#	N/A	N/A	6¼, 3¼	N	N	T	297	1,316	950
3	220	Y	Y	3	3	½, ¾, 1	N/A	Y#	3	S	29¼x25½#	N/A	N/A	6, 3	N	Y	T	400	1,884	1,400
2	220	Y	N	N/A	2¾	¾	N/A	N	2¾	S	24x18#	*	*	4¼, 5¼, 8¼	N	N	F	155	1,695	1,695*
1	110	N	Y	N/A	2½	½, ¾	N/A	Y*	⅞	T	18x15¾#	N/A	N/A	3, 1⅜	N	Y	T	142	537	450
3	220	Y	Y	4⅞	3	½, ¾	1	Y	3	T	N/A	28x29½#	36x29½	3, 4³⁄₁₆, 7	Y	N	T	400	1,995	1,650
½	110	N	Y	N/A	N/A	½	N/A	N	⅞	T	27x19	N/A	N/A	1½, 2⅝	N	Y	US	141	N/A	380
2	220	Y	N	4	3¼	1	½, ¾, 1¼	Y	3	S	27½x20½#	N/A	27½x40	6, 4¾, 4¼, 3, 2¼	N	N	T	396	1,600	1,295

2. (MQ) Movable quill only; (MQM) Movable quill and motor.
3. # symbol for machines with router collets as standard equipment. * ¼"-collet only.
4. # symbol next to standard table size of listed model. * 40"-and 60"-long side extensions available.
5. (F) France; (T) Taiwan; (US) United States
6. Selling prices based on advertisements, catalogs, and dealer inquiries at time of article's writing. *Free accessories available when machine purchased at demonstrations.

Delta
800-438-2486 or 412/963-2400

Freeborn
800/523-8988 or 509/535-3075

Freud
800-334-4107 or 919/434-3171

Grizzly Imports
East of Mississippi River: 717/326-3806
West of Mississippi River: 206/647-0801

Jet
800-426-8402 or 206/572-5000

Kity (Available from Farris Machinery)
800-872-5489 or 816/229-3055

Powermatic
800-248-0144 or 615/473-5551

Sears
Contact your nearest store.

Sunhill
206/575-4131

SANDING

STRATEGIES FOR TAKING THE DRUDGERY OUT OF PREPARING WOOD FOR FINISHING

Ask any group of woodworkers what they like least about their craft, and we bet that most of them will vote for sanding. In fact, inventors and manufacturers from far and wide have devised one gadget after another to extract the pain out of this drudgery. For truly professional results, you need to get through the maze of abrasives and tools, know which ones to use for each job, and learn the tricks for putting these products to good use. And, that's where this short course comes in.

CHOOSING THE BEST ABRASIVE FOR THE JOB

If picking and choosing among today's abrasives rubs you the wrong way, just keep these buying points in mind:

• **You can select from three types of abrasives:** garnet, aluminum oxide, and silicon carbide. See the chart *opposite top* for the advantages of each.

Garnet papers have naturally occurring minerals bonded to their surface. Because these grains have to be sifted, they're not consistent in size, so they abrade a surface less uniformly than man-made abrasives such as the following two varieties.

Besides having consistently sized particles, ***aluminum-oxide*** and ***silicon-carbide*** abrasives (both man-made) last longer because of their greater hardness. You can purchase the finer grades of these papers with a zinc-stearate coating which acts as a dry lubricant to reduce load-up of the surface with wood particles. Although this coating gives the abrasive a white coloring, don't assume that all white-colored abrasives have a zinc-stearate coating. For example, 3M colors its Stikit line of self-adhesive papers white for brand-identification purposes. To spot a zinc-stearate-coated product, look for words such as "no-load," "no-fill," or "nonclogging." Although this coating adds a few cents to the cost of abrasives, we've found that it's money well spent.

SHORTCUTS

PROVEN TECHNIQUES FROM THE SHOP TESTED WOOD MAGAZINE SHOP

ABRASIVE LANGUAGE: DEFINING THE CHOICES

ABRASIVE	SUGGESTED GRITS	ADVANTAGES	COMMENTS
Garnet	60, 80, 100, 150	• Has less tendency to burn end grain because garnet particles break down easily. • Low cost	• Garnet paper has a relatively short lifespan. • Available in paper-backed sheets only. • Grains of inconsistent size and color.
Aluminum Oxide	60, 80, 100, and 150 in belts. 60, 80, 100, 150, 220, and 320 in sheets	• Cuts faster, lasts longer, and has a more uniform surface than garnet abrasives.	• About the same price as garnet papers. • Grains of consistent size and color.
Aluminum Oxide with Zinc-Stearate Coating			• Zinc-stearate coating reduces load-up in fine grits.
Silicon Carbide	220–1500 in sheets	• Cuts faster and lasts longer than aluminum oxide. • Zinc-stearate coating reduces load-up. • Cuts faster, with less load-up, in glue-impregnated substances such as particleboard.	• Because of its higher cost, we prefer silicon-carbide abrasives for wet-sanding only. • Use with water for wet-sanding finish coats. • Grains of consistent size and color.

GETTING THE RIGHT GRIT

Grit	Heavy wood removal	Surface shaping	Surface flattening	Smoothing	Preparation for finish	Between finish coats
40	■					
60	■	■				
80		■	■			
100–120				■		
150–220					■	
320–600						■

• **Go with a grit to match the job.** An abrasive that's too coarse will lead to excessive scratch marks in your project's surface, and you will have to work hard to remove them. On the other hand, a sandpaper that's too fine for the job will clog with wood particles. So, check the chart *above* for the correct succession of grits for your projects. In the *WOOD*® magazine shop, we typically true a surface with a 60-grit aluminum-oxide abrasive when necessary, then smooth the project with 120-grit garnet sandpaper. To prepare softwood surfaces for a finish, we sand with 150-grit garnet paper. Because hardwoods can take a more polished surface prior to finishing, we sand these woods with a succession of 150-grit paper and a 220-grit zinc-stearate-coated aluminum-oxide abrasive.

• **Know when to use an open-coat paper.** Most sandpapers have a closed coat, meaning that 100 percent of their surface is covered with abrasive grains. However, in some coarse grits you will find open-coat papers with only 70 percent grain coverage on their surfaces. This extra space between grains helps prevent clogging of the abrasive surface with wood fibers, especially when you work with softwoods.

GETTING THE MOST FROM SANDING TOOLS

Even the proper abrasives aren't of much help until you combine them with the correct tool. To help you along, we prepared the chart on the next two pages. In the *WOOD* magazine shop, we make great use of the stationary belt/disc sander, portable belt sander, and our own hands for many sanding tasks. The following tips will help you better utilize these tools in your shop.

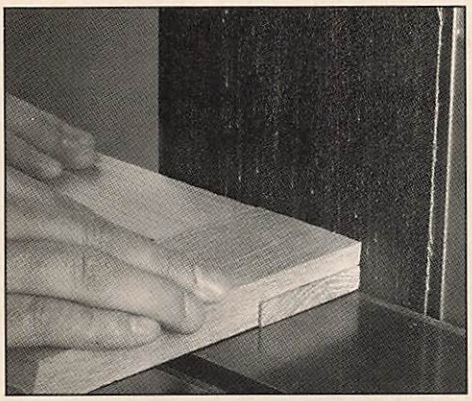
Continued

SANDING SHORTCUTS

STATIONARY BELT/DISC SANDER TIPS

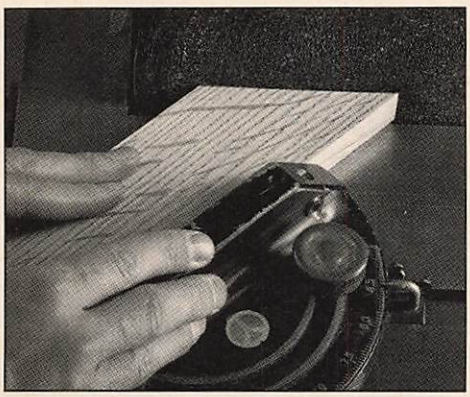
• **For perfectly flush half-lap joints,** cut the half laps 1/16" longer than the finished size, then sand them flush with a disc or vertical-belt sander as shown *below.*

Note: *For this procedure, and the next two tips, the belt- or disc-sander table must be set at 90° to the abrasive surface.*



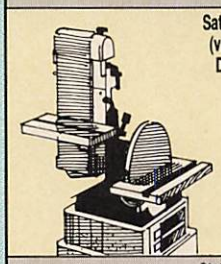
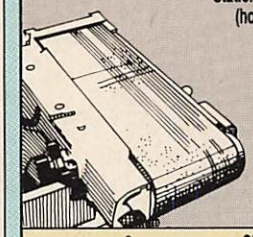
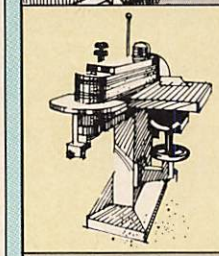
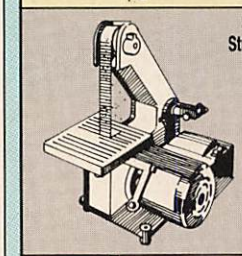
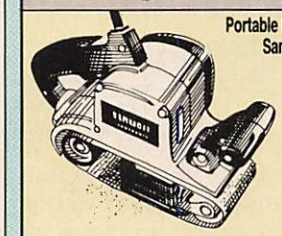
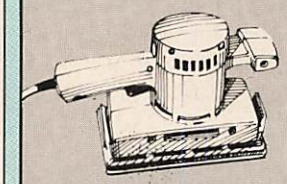
Slightly long half-laps joints come perfectly flush with the aid of a disc or vertical-belt sander.

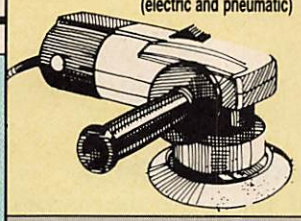
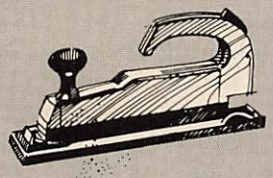
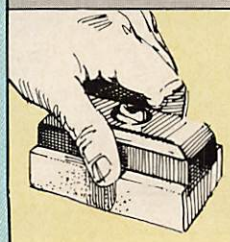
• **Fine-tune miter joints** on a vertical-belt or disc sander as shown *below.* Since few woodworkers can cut perfect miters every time, this method allows you to custom-match miters with complete control over stock removal. Because the disc moves faster near its rim than near its center, sand close to the center of the disc for slower, more controlled stock removal.



For slightly miscut miters, you can sand one of the pieces to fit the other exactly.

A BAKER'S DOZEN SANDING MACHINES: ONE FOR EVERY JOB

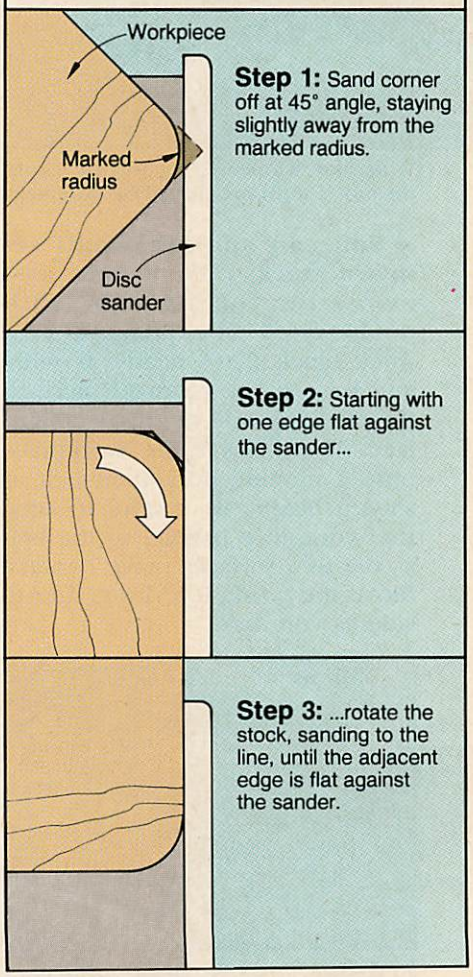
SANDER	PURPOSE	APPLICATIONS	SUGGESTED ABRASIVES
Sationary Belt (vertical) and Disc Sander 	Rapid removal of stock on edges.	Sanding back to a line. Touching up miters and compound angles. Chamfering or rounding dowel ends.	36- to 120-grit cloth-backed aluminum oxide.
Stationary Belt (horizontal) 	Rapid removal of stock on surfaces.	Flattening small areas of face grain. General smoothing and truing. Shaping. Use end of belt as free-hand drum sander.	36- to 120-grit cloth-backed aluminum oxide.
Stationary Edge Belt Sander 	Rapid removal of stock on edges.	Smoothing edge grain. Sanding back to a line. Concave sanding on the open roller.	36- to 120-grit cloth-backed aluminum oxide
Stationary Strip Sander 	Sanding small parts.	Metal sharpening. Inside edges and tight areas.	36- to 120-grit cloth-backed aluminum oxide.
Portable Belt Sander 	Rapid removal of stock on large, flat surfaces.	Truing stock glued up for width. Lowering joints and edges to a uniform height. Mounted in accessory stands, these machines work as small stationary belt sanders.	60- to 120-grit cloth-backed aluminum oxide.
Finishing Sanders 	Smoothing surfaces and protective finishes.	Final sanding. ¼-sheet (palm) sanders useful on small areas. ⅓- and ½-sheet models best for larger areas.	120- to 320-grit paper-backed aluminum oxide, garnet, or silicon carbide.

SANDER	PURPOSE	APPLICATIONS	SUGGESTED ABRASIVES
Random-Orbit Sanders (electric and pneumatic) 	High-speed finish-sanding without swirl marks.	Flattening joints while leaving a smooth surface. Special pad available for contours.	80- to 320-grit paper and adhesive-backed aluminum oxide and silicon carbide.
Straightline Sanders (electric and pneumatic) 	Sands with the grain.	Flattening high-low areas. Lowering joints and edges to a uniform height.	80- to 320-grit cloth-backed aluminum oxide and silicon carbide.
Flexible Disc Sander	Rapid stock removal on irregular surfaces.	Shaping, smoothing, and polishing small stock. Power-sanding bowls when chucked in a portable drill with lathe running. Various sizes available from 1-6".	36-to 400-grit cloth-, paper-, and adhesive-backed aluminum oxide and silicon carbide.
Flap Wheels	Conform to irregular surfaces.	Corrosion removal on tools and hardware. Sanding carvings and spindles.	60-to 180-grit cloth-backed aluminum oxide
Drum Sander	Sanding concave and convex edges to smooth, flowing shapes.	Sanding back to a line on curved, bandsawed edges.	60- to 150-grit cardboard-backed aluminum oxide.
Pneumatic (inflatable) Drum Sander	Smoothing and shaping of irregular surfaces	Smoothing carvings and intarsia parts. Fill drum bladder to varying pressures to change conformity of drum.	80- to 180-grit cloth-backed aluminum oxide
Hand Sander 	Controllable truing and smoothing.	See page 67 for specialized sanding blocks to help you sand tight and irregular surfaces. Foam sanding blocks work well on rounded surfaces.	80- to 1,500-grit paper-, cloth- and adhesive-backed garnet, aluminum oxide, or silicon carbide.

• **Perfectly shaped corners** result from marking a radius and then carefully sanding back to that line with a belt or disc as shown *below*. For maximum control, follow the illustrations *below*.

Use a disc or vertical-belt sander to shape flowing convex curves.

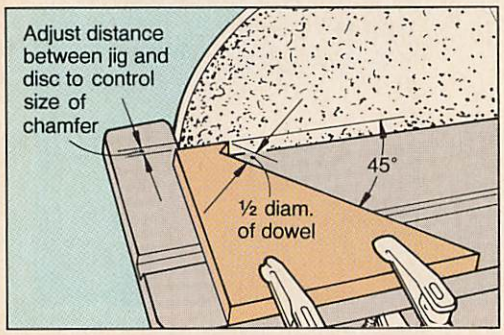
SANDING SMOOTH CORNERS

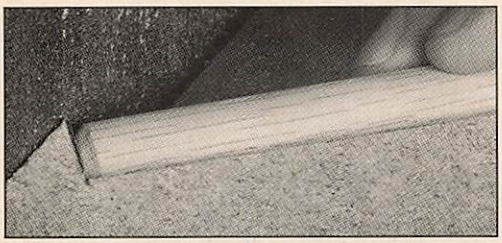


Continued

SANDING SHORTCUTS

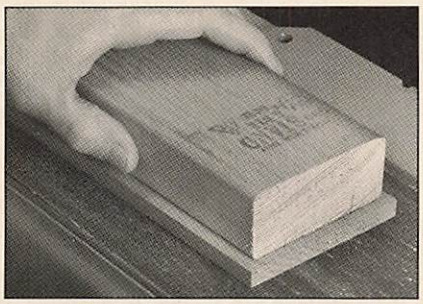
• **Make great-looking dowel chamfers** with the jig *below* clamped to your sander's table. With your sander running, place the dowel on the machine's table and hold it as shown *below*. Give the dowel at least one full rotation to sand a complete chamfer.





With the chamfering jig in place, spin the dowel until the chamfer is complete.

• **You can smooth small resawed stock,** even if you don't own a thickness planer. With double-faced tape, attach a 1½"-thick block that's nearly as wide and long as the resawed piece to the face opposite the resawed surface. Then, lower the workpiece onto a moving horizontal belt as shown *below*. Be careful to keep the workpiece parallel to the belt as the two surfaces make contact. Move the workpiece from side to side as you sand.



To smooth resawed stock, position it parallel to the sanding belt.

PORTABLE BELT SANDER POINTERS

• **For rapid stock removal with a portable belt sander,** hold the sander at approximately a 30° angle to the grain of the workpiece, and keep it cocked this way as you move the machine up and down the workpiece. This cross-grain sanding works fast, but leaves a rough surface.

• **To smooth surfaces,** work the belt sander as shown *below*. Hold the sander parallel with the grain, and keep the belt sander moving at all times. Work the sander in long paths that cover the full length of the workpiece. Minimize cross-grain movements.

• **For an evenly sanded surface,** don't bear down on the machine; let the weight of the sander do the work. And, be aware of how much of the belt is in contact with the workpiece. Otherwise, you may accidentally miss the ends of the surface, or round over the edges by tipping the sander.

• **Drape the power cord over your shoulder** to keep it out of the way of the belt sander.

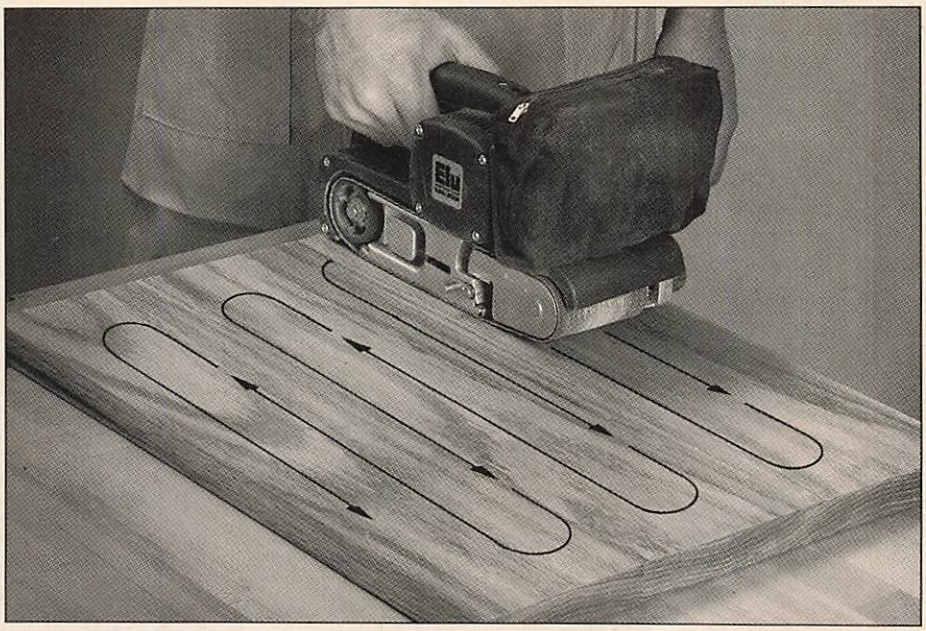
• **To check your work** for gouges and hollows, hold a light at a low angle to the surface.

HAND-SANDING HINTS

• **Don't sell short the merits of hand sanding.** Power sanders save you plenty of time—no doubt about it—but a good, old-fashioned sanding block flattens a surface better than any machine. Also, a hand block gives you more control over those delicate situations such as gently rounding an edge. Around the *WOOD* magazine shop, we use a sanding block for the final smoothing of flat surfaces and between finish coats.

• **To save hand-sanding time,** you may want to invest a few dollars in a 3M Stikit sanding block such as the red one shown on page 62. We found these plastic blocks comfortable, and abrasive changes take just a few seconds. To replace the sandpaper, you simply tear off the old abrasive and pull some fresh material from the built-in roll.

• **Custom-made sanding blocks** will save you loads of time when sanding tricky areas. As shown



Try to minimize cross-grain movements when smoothing a surface with a belt sander. Sand the full length of the workpiece and keep the machine moving.

below you can shape a variety of custom-made blocks to conform to most any smoothing task. Then, attach an adhesive-backed abrasive. Or, affix nonadhesive abrasives with glue or adhesive spray—just remember that the paper will be difficult to remove.

A FEW MISTAKES TO AVOID AT ALL COSTS

Sometimes, what you *don't* do while sanding counts as much as what you *do* do. For help, keep these pointers in mind.

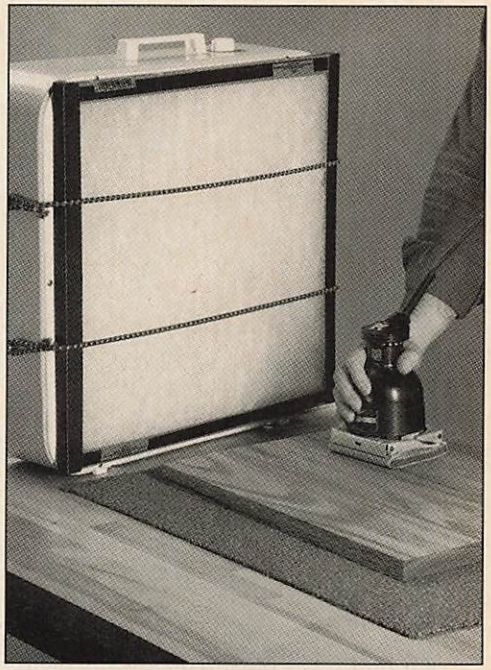
• **Don't let load-up bog you down.** Steve Martyr, a technical representative of 3M, estimates that most people toss away their sandpapers long before the abrasive particles wear out. The reason: premature load-up of the abrasive with sanding dust. If you experience load-up early in the life of your abrasives, Steve suggests you switch to either a coarser grit or an open-coat abrasive, or try a zinc-stearate-coated product.

Also, remember to collect sanding dust from the work surface to avoid load-up. Occasionally stop and vacuum both the work surface and the bottom of the sander.

• **Sanders can be as dangerous as any other cutting machine in your shop,** so keep all guards in place. If you've ever accidentally touched a moving sanding belt, you know how fast abrasives can remove skin. Guards also protect you if a belt tears.

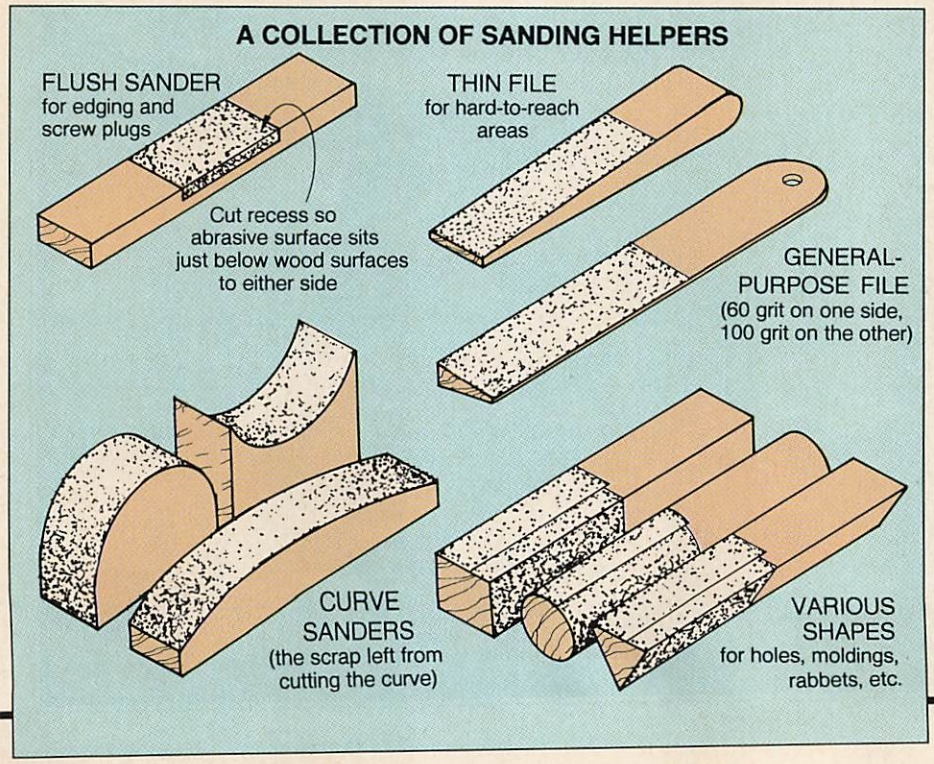
• **Sanding dust contributes to lung disease,** so opt for machines with dust collection capabilities when you go shopping. In recent years, power-tool manufacturers have concentrated more and more on dust-collection in designing their tools. For instance, today you can buy finish sanders that draw dust through holes in the sandpaper and portable belt sanders with vacuum attachments.

If your sanders don't have dust-collection ports and accessories, rig up your own clean-air aids. As shown at *right,* you can attach a furnace filter to the air-drawing side of a window fan, then point the fan away from you as you work. This simple dust collector will move much of the airborne dust away from you, and capture some in the process. But, remember that even with dust-collection systems in place, it still pays to wear an approved respirator.



We strapped a furnace filter to a window fan with bungee cord for an inexpensive dust evacuator.

• **Don't accidentally mar your flat workpieces** by setting them on a bare workbench when sanding them with an orbital finish sander. Instead, place some kind of cushion, whether it's a piece of carpet pad, cardboard, or even a blanket, under the workpiece before finish-sanding it, as we did in the photo *above.* Otherwise, any debris on the surface of your workbench will transmit swirly marks and dents to the back side of your project.



Buying Guide

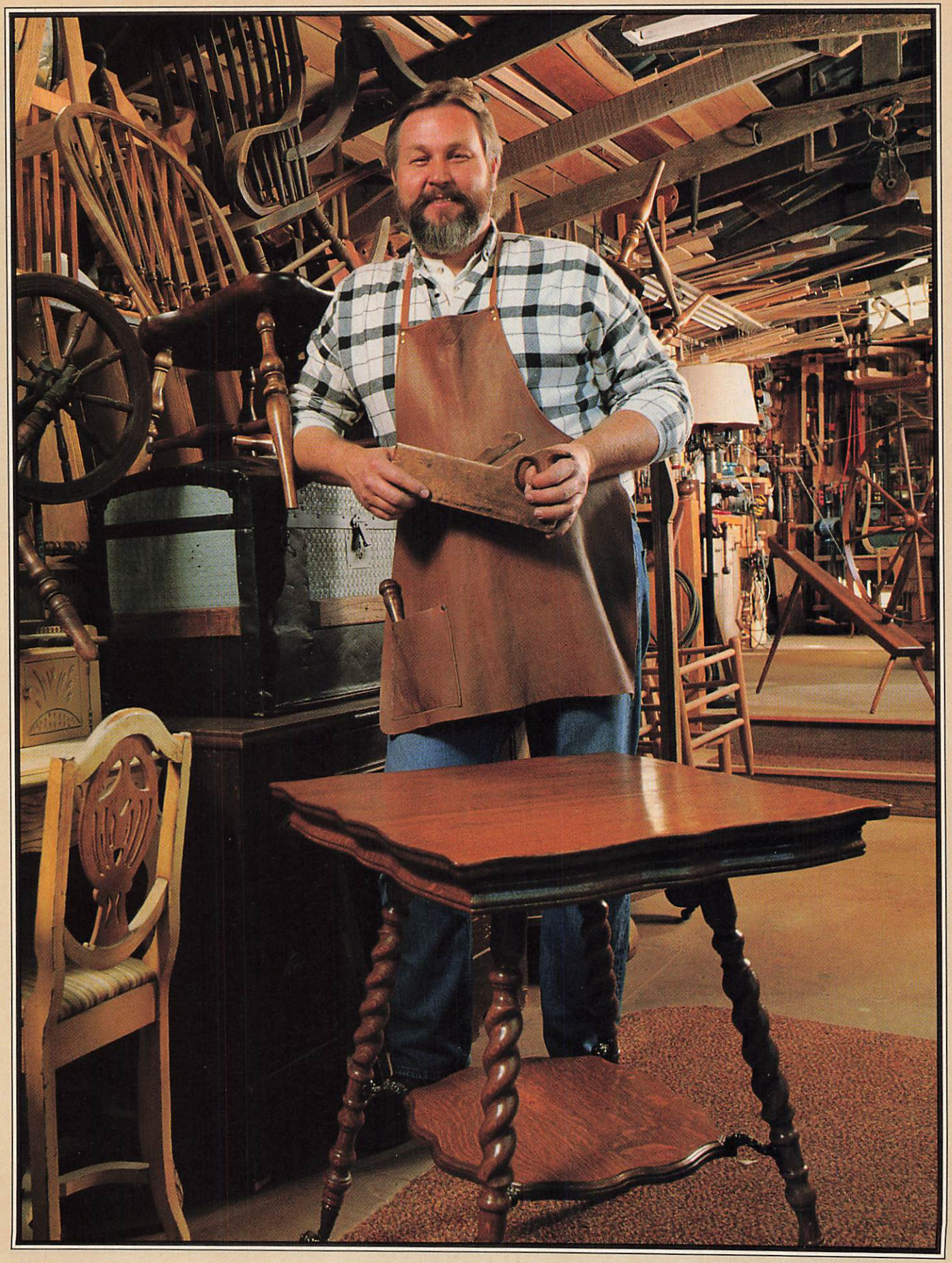
For free catalogs of abrasive supplies, contact these companies:

Econ-abrasives, P.O. Box B865021, Plano, TX 75086. Call 800-367-4101.

Industrial Abrasives, 642 N. 8th St., P.O. Box 14955, Reading, PA 19612. Call 800-428-2222.

The Sanding Catalogue, P.O. Box 5069, Hickory, NC 28603-5069. Call 800-228-0000.

Written by Bill Krier
with Jim Downing
Photographs: John Hetherington
Illustrations: Jim Downing; Jim Stevenson; Mike Henry



OZARK CRAFTSMAN JIM WATSON HAS A PHILOSOPHY ABOUT OLD FURNITURE

"GOOD WOOD IS WORTH RESTORIN' "

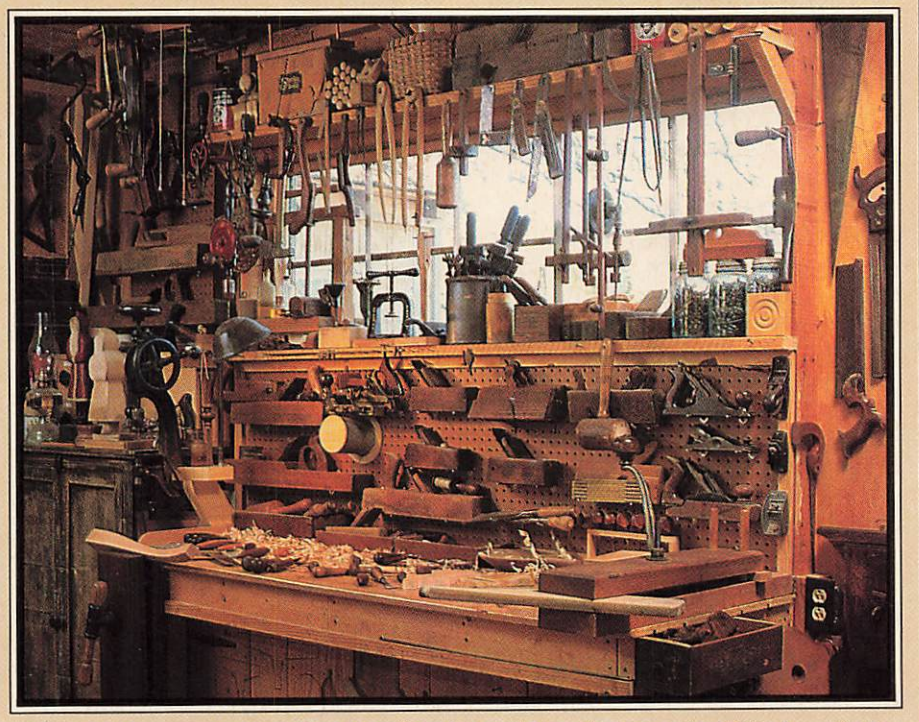
Like most young couples just starting out, Jim and Sue Jo Watson made do with what they could afford. "Back in the early 70s, you could pick up a lot of nice furniture here cheap," says Jim. "It just happened to be in real bad shape."

That didn't hinder this talented and resourceful Arkansas native, though. Working wood had always held his interest. So, while he spent his days managing an auto supply store, he occupied his evenings renewing furniture.

The fruits of his labor were a houseful of valuable pieces . . . and a growing reputation as a furniture restorer. "I got so busy doing other people's furniture, I decided to go at it full-time," Jim says. "I've never been sorry."

His business started small. On a four-acre hilltop site just outside Huntsville, Arkansas, he built a cozy house and a small shop. In the seven years since, both have grown, even to include a shop for Sue Jo, who paints and sells primitive decoys to shops and collectors across the country.

When we visited Jim, 41, and Sue Jo, 39, they showed us how and why their business matured. Now we know the reason customers from far and near cart their heirloom chairs, tired tables, and estate-auction finds to the Watsons' Ozark enterprise: They want quality craftsmanship.



Jim's collection of refurbished hand tools aren't for display only. With them, he recreates the workmanship that matches old furniture.

A man and his tools work at building a reputation

Even on the Ozark ridges, Jim Watson classifies as a mountain of a man. His 6'6" frame fills the shop doorway when greeting customers who drop by. Large, muscular hands firmly grasp the furniture they bring to him. Jim handles each piece gently, though, as he would a baby. He draws the sad-looking piece to him, then guards it on the way to its resting place in the stack of furniture of similar ilk awaiting his careful attention.

"I like to pull something back, to make a beautiful piece of furniture out of a thing that looked terrible," Jim explains, almost apologizing for his caring. "Sorry, inexpensive furniture is a dime a dozen. But, if it's good wood, it's worth restorin'."

In Jim's workshop, even the crossbeams store tools. Not jigsaws, routers, or electric drills with dangling cords, though. It's hand, not power, tools that he keeps within easy reach.

"I used to go around and buy old tools, then restore them for use," Jim explains. "Now, there are a lot more good new tools out there than when I started twenty years ago. But, I'm still not dependent on anyone to furnish me with a good tool. I've always made everything when I needed it, and if I can't find the right tool, I make it—a carving gouge, chisel, plane iron, or a special veneer cutter. It gives me a pretty good feeling to do that," adds the unassuming craftsman.

Continued

GOOD WOOD IS WORTH RESTORIN'

To make tools and other items he needed, Jim long ago mastered the basics of blacksmithing. A small smithy attached to his main work space attests to his continuing interest.

There's another reason, besides self-sufficiency, why Jim relies a lot on hand tools. "Much of this old furniture was made with hand tools, and that adds to its beauty. You don't get the hand look with power tools," he claims.

"Oh yeah, I do all my roughing out with a bandsaw," Jim continues. "Or, I'll power-plane a board down within ⅛" of what I need. Then, I'll take an old hand plane to it the rest of the way. That's so I can leave those tiny plane marks in it. The piece will match the original parts, where some ol' fella did the same thing. You just can't get the same look with anything but a hand plane."

Then, in rugged contrast, comes the occasional piece of primitive furniture—rough stuff, made by pioneers when they needed it—that never saw a hand plane. "It's real interesting to restore a piece like that," he says, "but it's harder than making something new."

The furniture neatly stacked in the "receiving room" of Jim's shop hints that making wood look old may not only be harder, but also more time consuming. Jim looks over the armoires, desks, chairs, tables, and mirrors nestled together up to the eaves. "I'm behind," he says, shaking his head, "but I'm not behind because I'm slow. I'm willing to spend more time with it in my hands. I don't send out a piece unless I like it."

Getting down to the wood

Many people bring furniture to Jim for the same reason he began restoring nearly 20 years ago: They can't afford to buy new furniture of the same quality. Others, according to the craftsman, have acquired family heirlooms that need TLC, or purchased antiques at auction. "Some don't have any money in the item, others may have paid well, but they all understand that it will be worth more when I'm done," he says.

Although complete restoration represents the bulk of Jim's work, he gives quick face-lifts, too. "Occasionally, people drop off a piece for refinishing that actually doesn't need it," he says. "The joints are all solid, and maybe it's a little worn, but it doesn't need stripping—only a good cleaning."

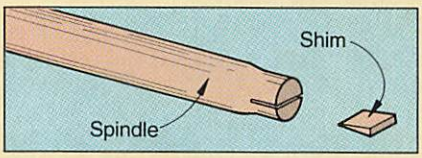
JIM'S TOP 10 TIPS FOR TIRED FURNITURE

Furniture is part of everybody's life, and probably everybody has repaired some furniture," observes the brawny craftsman. "But, there's good and bad ways to repair."

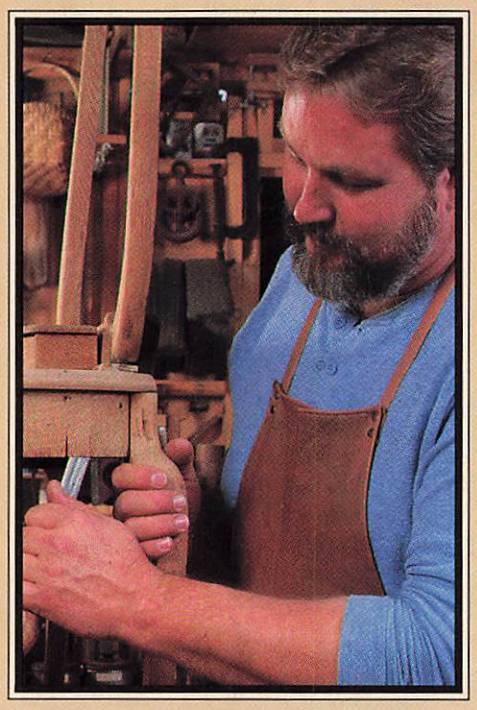
Take nails, for a bad example. Jim hates them. "Nails don't belong in furniture," he says. "They're not even in my woodworking vocabulary. I use a screw if I need extra strength. Or a peg. Or a dowel. You can ruin a piece trying to get a nail out. With finishing nails, it's better to push them, then fill the holes."

Here are more of Jim's tips, focused on restoring and tempered with some of his philosophy:

- *In old furniture, use old wood.* "If I have to make a replacement piece, such as a stretcher or spindle in a chair, I make it from old furniture someone discarded. If I have to use new wood, I put it where it can be stained easily to blend in."
- *Don't remove parts that were handmade and replace them with machine-made parts.* "To the collector, that piece would be ruined. On the other hand, don't overwork [with hand tools such as a plane] a piece of wood that you're trying to make match. It's easy to get carried away, but you don't want to make more marks on the wood than the original piece would have had."
- *Don't take all the character away from a piece of old furniture by making it look too new.* "Fix the big cracks, gouges, burns, and stains, but leave the small things, like nicks and dents, that the wood acquired over the years."
- *Roll a spindle to break it loose.* "Got a loose spindle between chair legs, but it won't come out? Roll it back and forth between your fingers. The turning creates friction heat that will soften all the old glue."
- *Shim a spindle to fill the hole.* "After years of wear, the hole in the chair leg that the spindle fits into sometimes gets enlarged. To tighten the spindle, saw a slot in the tenon end and fill it with a thin wedge." See drawing, *below*.



- *Scrape off all the old glue from joints.* "With a knife blade, clean out the old glue. But don't do anything that will remove more than the glue."
- *Lift old veneer with a table knife.* "It's the handiest tool. It slides right under the veneer [as shown in photo, opposite *above*].



Jim carefully guides the blade of a bread knife under loose veneer to remove it.

The extent of the cleaning depends on the condition of the piece. "Often, I can just wash it down with water and Murphy's Oil Soap," Jim notes. "But, if it still looks dingy, say from built-up wax and polish, I go over it with fine steel wool dipped in mineral spirits. Even stronger is a mixture of three parts each of mineral spirits and boiled linseed oil to two parts each of vinegar and denatured alcohol. That really cuts, and softens up the original finish a bit so you can spread it around to recover blemishes."

Stripping furniture, of course, is a whole different ball game, and Jim has plenty of advice about the process. "First of all," he says, "I use a water-wash stripper. I don't dip-strip, either, except when furniture has many coats of paint on it. Dip-stripping is real hard on furniture. And, it has to be made of solid wood or it won't stand up. But, if you must take something for dip-stripping, count on taking it all apart first, if you can. Because if any of the joints are loose, they'll come apart anyway."

For those who don't mind stripping furniture, Jim has a couple of tips: "When you give $12 a gallon for stripper, you don't want most of it ending up on the ground. So, with a chair for instance, put a pan under each leg to collect the stripper. And remember, stripper evaporates quickly, but you have to keep the surface wet. Sprinkle a little sawdust on the stripper—make kind of a mush—to keep it working."

Written by Peter J. Stephano
Photographs: Bob Hawks

Then, work the knife slowly, prying up the veneer an inch or so at a time, not breakin' any."

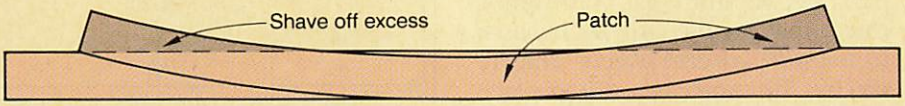
• *Feather out a veneer patch.* "I patch old veneer with old veneer that I've salvaged, because it will be the same thickness. But, for a nearly invisible patch, instead of cutting the old veneer out and fitting in a patch of exactly the same shape, cut the patch slightly oversize. Then, sand down or feather the veneer surrounding the cutout. After you align the grain and glue down the patch, it will overlap the old veneer a bit [see drawing, *below*]. Clamp it tightly in place. After the glue dries, sand down the raised edges of the patch to make it flush."

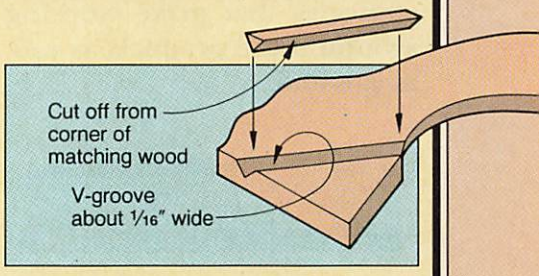
• *Mend a break with wood.* "Most breaks on old furniture aren't fresh. The piece breaks again and again in the same place, taking off a little more wood each time. If you glue it, then add filler, the mend shows up. I mend it by shimming the crack with a piece of the same type of wood.

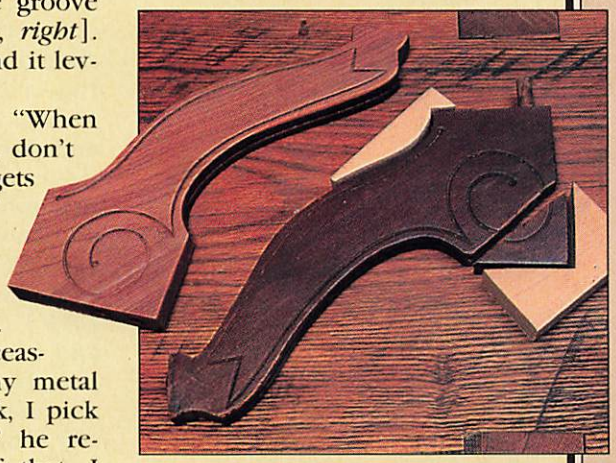
"With a veining tool, remove wood in a V-shaped groove right down the crack. Then, cut off a corner of a board of matching wood and glue it in the groove [see photo and drawing, *right*]. Clamp it in place, and sand it level when dry."

• *Don't sand too much.* "When you do have to use filler, don't oversand it. The filler gets slick and resists staining."

Jim could seemingly go on forever about working wood—and reworking old wood. That's because he never ceases to learn. "Between my metal work and my wood work, I pick up things all the time," he remarks. "And, because of that, I know what I'm doing won't ever get stale."







You can hardly detect the shimmed crack, illustrated in the drawing above, in the repaired table leg shown at top in the photo. For reliable, in-line clamping of irregularly shaped pieces like these, Jim lays out and cuts custom gluing jigs such as the ones of pine shown surrounding the lower leg.

BATTLING HARMFUL

By now, most woodworkers have at least heard about the new, less-toxic finishing products available—water-based finishes, odorless strippers, and other "safe" materials. But chances are that you have an ample supply of less friendly finishes and solvents in your shop. You know, the ones that inflame your eyes and irritate your throat and nose. So what should you do? Start by reading this article. You'll learn how to determine which products pose the most danger to your health and the strategies that make working around these products as safe as possible.

THE ENVIRONMENT IT'S ALL WE HAVE

Introduce yourself to MSDS

Angela Babin, director of the Center for Safety in the Arts (CSA) in New York City, has the following recommendation. "When selecting wood finishes and paint removers," she says, "ask your dealer to see a copy of the Material Safety Data Sheet (MSDS) for each of them. Lacquers, varnishes, thinners, and products like these all have different formulations. When you request the MSDSs, you can choose the safest one."

Retail outlets, including home centers and hardware stores, have the government-required MSDSs available, or they can obtain them in a day or two. However, retailers don't normally have MSDSs in quantities to hand out because the goverment requires only business users to have them.

And, it's a good idea to obtain MSDSs for products that you may already have at home, too. Just contact the dealer that carries those brands to see if they have the appropriate MSDS, then drop by and inspect it. Or, request one from the manufacturer, whose address usually appears on the label.

On an MSDS, such as the one shown *opposite,* you'll find a listing of the hazardous ingredients, as well as emergency information and phone numbers, spill or leak procedure instructions, and health-hazard data. In addition—and most important—each product's MSDS carries a toxicity indicator—the *threshold limit value* (TLV) of its primary chemical—and maximum exposure time. Remember, MSDSs from different manufacturers never look alike, but they always carry this info.

TLV numbers for specific chemicals indicate the levels of airborne contaminants, stated in parts per million (e.g. 350 ppm), *that most people can be exposed to without adverse effects.* They're set by the American Conference of Govermental Industrial Hygienists (ACGIH) for a long list of common chemical ingredients. (On the MSDS shown *below right,* Borden has also listed a TLV published by OSHA for acetone.) Here's how to interpret TLVs:

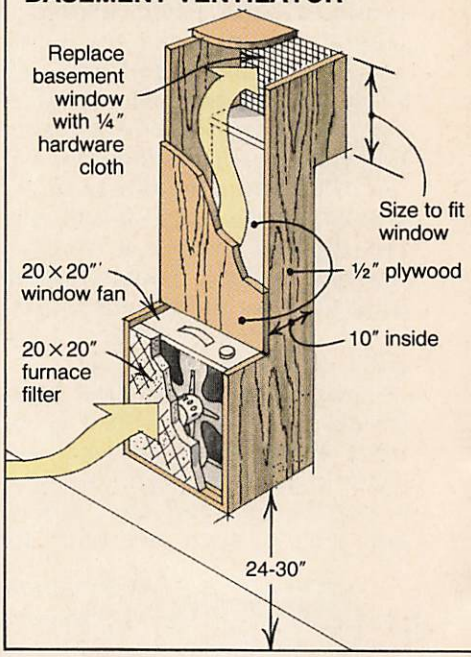
500-plus ppm: Slightly toxic
100–500 ppm: Moderately toxic
Fewer than 100 ppm: Highly toxic

Remember that—contrary to what you usually encounter—TLVs of the *lower* numbers are the most dangerous. The smaller the number, the greater the potency!

Work without a noseful: Bring in fresh air

According to Michael McCann, executive director of the CSA and coworker with Babin, air contaminated by chemical vapors can be disposed of in one of two ways. Commercial shops that generate high concentrations of toxic materials in their shop air require *local exhaust ventilation,* such as a

A SIMPLE-TO-BUILD BASEMENT VENTILATOR



VAPORS

Strippers, solvents, and finishes giving you a noseful? Here's help!

separate spray booth with a hood, an air cleaner, and a fan, for spraying and dust removal. Most home woodworkers, however, can successfully maintain a clean-air situation in their work space with *dilution ventilation.*

Dilution ventilation simply means that you bring in a large volume of clean air to reduce the concentration of toxic material, then remove the air. The simplest form of dilution ventilation is a wide-open window at one end of the room and another open window or door opposite.

Even better dilution ventilation requires the use of a fan or fans to move a volume of air through the work area. "It's important," says McCann, "that clean air come past your face, get contaminated, then be exhausted. That's crucial." Place yourself as shown *below,* when working with toxic vapors.

You can also add effectiveness to your dilution ventilation system by building the setup illustrated in the detail drawing, *below left.* The working-level exhaust constantly draws in fresh air and mixes it with the toxic vapors to keep the concentration low. (Note: This do-it-yourself exhaust system is *not* designed to substitute for a spray booth.)

How do you know if you're getting adequate ventilation? Says McCann, "If you can smell vapors throughout the house, you're not exhausting enough air."

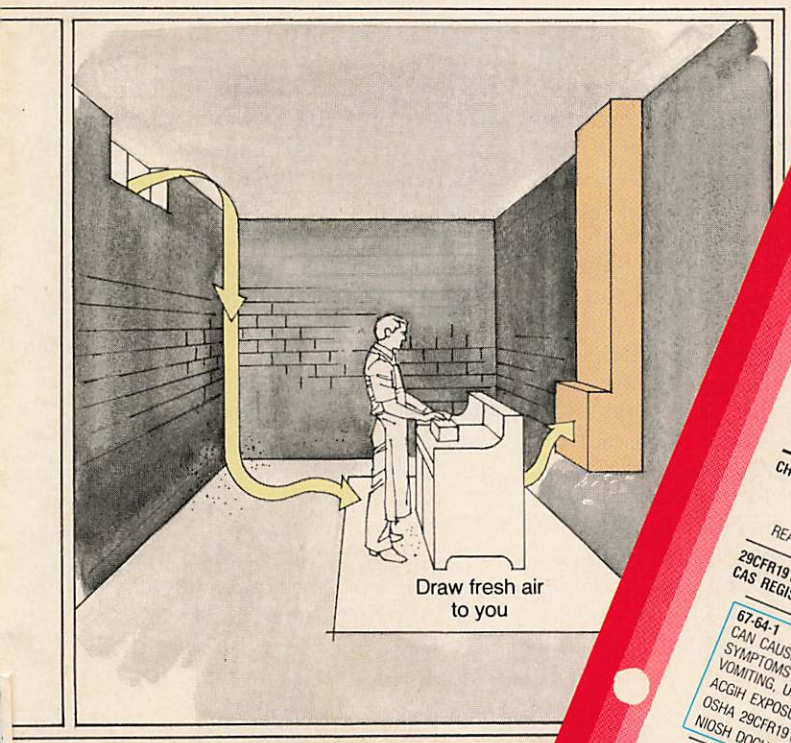
Protect yourself somehow

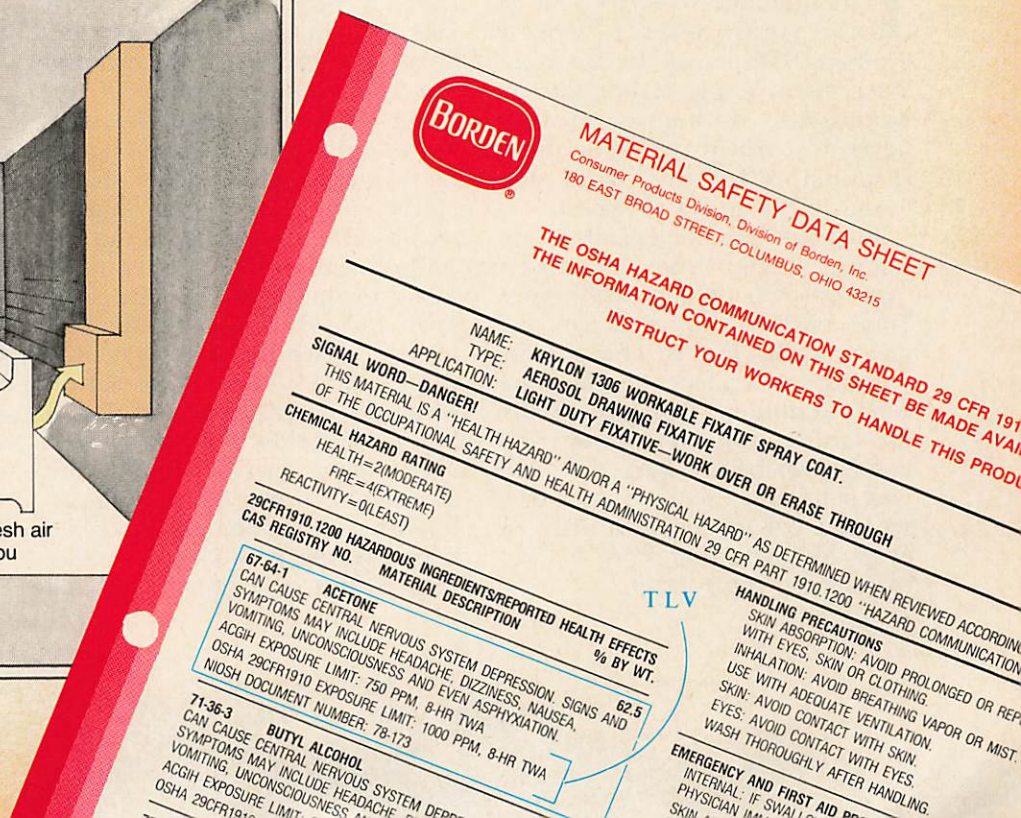
If you find it impossible to provide sufficient dilution ventilation in your traditional shop area when doing certain tasks—such as stripping or applying heavy-duty contact adhesive—then move the work to another location, preferably outdoors. "Another alternative," says the CSA's Babin, "is to 'sectionalize' a project that exceeds your ventilation capacity." For example, instead of brushing on sealer or varnish to the entire surface of a large piece of furniture—for instance, a bureau—apply finish to the trim at one session, the front of one drawer at a later time, and so on until it's completed. That way, your exposure will be limited.

In all situations, you can protect yourself from inhaling harmful vapors by using a dust-and-mist type respirator labeled "NIOSH/MSHA Approved for Organic Vapors." Complete with a pair of canisters, it costs about $35. (Read about how to buy approved masks in the January 1991 issue of *WOOD®* magazine.)

WANT TO KNOW MORE?
VENTILATION, 118 pp., $11.95 (U.S.) ppd. Includes designs for a local exhaust system and a spray booth, from: Center for Safety in the Arts, 5 Beekman Street, New York, NY 10038.

Written with George Bransberg
Drawings: Kim Downing




BORDEN
MATERIAL SAFETY DATA SHEET
Consumer Products Division, Division of Borden, Inc.
180 EAST BROAD STREET, COLUMBUS, OHIO 43215
THE OSHA HAZARD COMMUNICATION STANDARD 29 CFR 191
THE INFORMATION CONTAINED ON THIS SHEET BE MADE AVAI
INSTRUCT YOUR WORKERS TO HANDLE THIS PRODU
NAME: KRYLON 1306 WORKABLE FIXATIF SPRAY COAT.
TYPE: AEROSOL DRAWING FIXATIVE
APPLICATION: LIGHT DUTY FIXATIVE—WORK OVER OR ERASE THROUGH
SIGNAL WORD—DANGER!
THIS MATERIAL IS A "HEALTH HAZARD" AND/OR A "PHYSICAL HAZARD" AS DETERMINED WHEN REVIEWED ACCORDIN
OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION 29 CFR PART 1910.1200 "HAZARD COMMUNICATION
CHEMICAL HAZARD RATING
HEALTH=2(MODERATE)
FIRE=4(EXTREMF)
REACTIVITY=0(LEAST)
29CFR1910.1200 HAZARDOUS INGREDIENTS/REPORTED HEALTH EFFECTS
CAS REGISTRY NO. MATERIAL DESCRIPTION % BY WT.
TLV
67-64-1 ACETONE 62.5
CAN CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION. SIGNS AND
SYMPTOMS MAY INCLUDE HEADACHE, DIZZINESS, NAUSEA,
VOMITING, UNCONSCIOUSNESS AND EVEN ASPHYXIATION.
ACGIH EXPOSURE LIMIT: 750 PPM, 8-HR TWA
OSHA 29CFR1910 EXPOSURE LIMIT: 1000 PPM, 8-HR TWA
NIOSH DOCUMENT NUMBER: 78-173
71-36-3 BUTYL ALCOHOL
CAN CAUSE CENTRAL NERVOUS SYSTEM DEP
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VOMITING, UNCONSCIOUSNESS
ACGIH EXPOSURE LIMIT
OSHA 29CFR191
HANDLING PRECAUTIONS
SKIN ABSORPTION: AVOID PROLONGED OR REP
WITH EYES, SKIN OR CLOTHING.
INHALATION: AVOID BREATHING VAPOR OR MIST.
USE WITH ADEQUATE VENTILATION.
SKIN: AVOID CONTACT WITH SKIN.
EYES: AVOID CONTACT WITH EYES.
WASH THOROUGHLY AFTER HANDLING.
EMERGENCY AND FIRST AID PR
INTERNAL: IF SWAL
PHYSICIAN IM
SKIN

In a world that thrives on change, some customs prove hard to break, thank goodness. After all, can you imagine the next Babe Ruth pinging a home run over a major league fence with—ugh!—an aluminum bat? Although many sports have yielded to equipment manufactured of high-tech materials, it's assuring to know that wood is rooted in sports tradition, and in some cases, still plays a pro role.

In his job as head of the wood identification department at the Forest Service's Forest Products Laboratory in Madison, Wisconsin, Regis Miller knows wood—and its history. He believes, too, that it's tradition that's responsible for the wood still found in the world of sports.

"Baseball bats, for example," he begins. "Aluminum has taken over everywhere, except the pros. That's because the metal bats just don't break—they're cheaper for schools and colleges in the long run. Aluminum bats supposedly hit farther, too. Yet, wood and baseball go back a long way, and you still can't use anything but a wooden bat in the pros." There's even an interesting story behind that special relationship.

There really was a slugger in Louisville

When baseball's first organized team, the Knickerbocker Base Ball Club of New York, took the field against the New York Nine for a four-inning game in 1846, the national pastime was launched. The Knickerbockers lost, 23-1, despite their handcrafted bats.

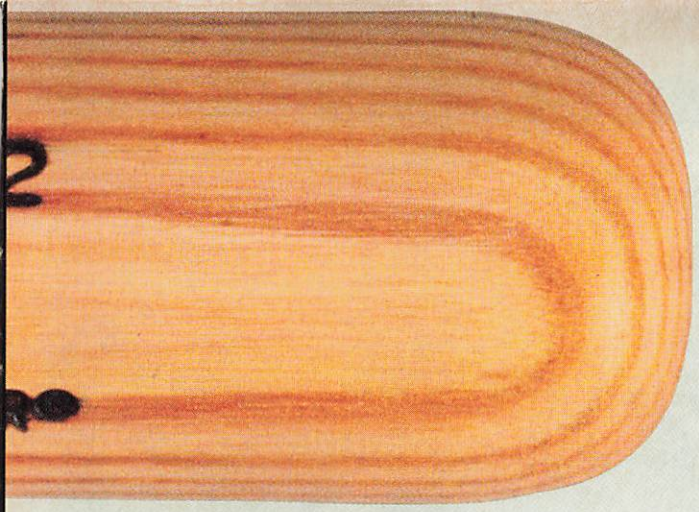
Yes, in the early days of baseball, the players made their own bats or had them custom-made. Some were hewed from hickory, but, like today, most were of ash.

Bill Williams, an executive with the Hillerich and Bradsby Company of Louisville, Kentucky, maker of the famous Louisville Slugger, tells us that it wasn't until the late 1800s that baseball bats were made by machine. "As the story goes, J. A. Hillerich, the founder of this company, was watching the local American Association team, the Eclipse, play one day in 1884. When Pete Browning, a .341 hitter, got up to bat, he swung and broke his favorite. After the game, Hillerich, who had been making bats for his sandlot team on his father's lathe, offered to make the star a new one. They worked together perfecting it that night," he continues. "The next day, Browning went three-for-three with his new bat. Soon, other team members, then players from visiting teams, wanted bats, too. That's how the Louisville Slugger was born."

According to Williams, a big leaguer uses an average of 72 bats per season. That's why Hillerich and Bradsby now regularly turns out bats for professional baseball to the tune of 185,000 per year out of a production of 1.4 million. With such a stake in big-time baseball, no wonder the company is so particular about where it gets its wood.

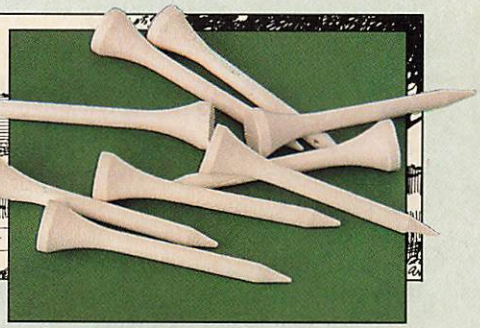
"The best bat ash grows in a belt along the New York-Pennsylvania state line," Williams continues. "From a 13′ log, we get 25 to 30 bats. That adds up to about 40,000 trees annually."

Ash may well be wood's major leaguer, but there are plenty of other species still in the sports spotlight. Take golf, for instance.



GOOD SPORTS

WOOD'S WINNING TRADITION CONTINUES—IN A BIG-LEAGUE WAY—EVEN TODAY



Wooden clubs may be giving way to metal, but brightly painted birch golf tees still outnumber plastic.

Some duffers just prefer persimmon

Golf really didn't take hold in the United States until about the turn of the century, although the Scottish invented the game way back in the 1400s. And, just as in most other sports when they were first adopted by an enthusiastic public, the very earliest equipment was made of wood—mainly because it was plentiful and easy to work.

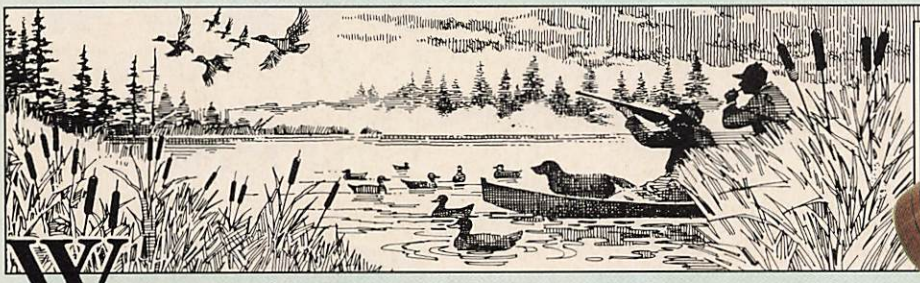
"Not only were heads made from wood, but club shafts were turned from stout and flexible hickory until somewhere in the twenties," notes Larry Frye, executive director of the Fine Hardwoods/American Walnut Association in Indianapolis. "I have some Walter Hagen clubs of wood that date between 1914 and 1929. But, most manufacturers switched to the stronger steel shafts between the world wars. Solid persimmon, though, has always been the choice for the heads of woods." Louisville Slugger's Williams is the first to agree.

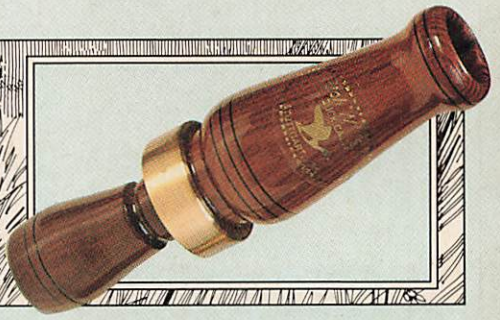
"In 1916, our firm [Hillerich and Bradsby] began producing golf clubs in addition to baseball bats," says Williams. "That was at a time when golf was just being promoted. In 1933 we created the 'PowerBilt' name. Now, we make the largest-selling persimmon golf club in America. We make metal woods also, but our persimmon woods are more famous. And, a lot of golfers still prefer persimmon—about 30 to 40 percent of all clubs sold have persimmon heads. But, golfers who like persimmon aren't always the older ones tied to tradition. In last year's Masters tournament, Jack Nicklaus and Ray Floyd were playing metal, while young Nick Faldo was using persimmon drivers.

"We now have our own persimmon mill in Litchfield, Kentucky, right in the middle of its range," he explains. "We mill the logs there and turn the heads for shipment to Louisville."

So, while some golfers still cling to tradition, there's another group of sportsmen who only have fond memories of a once-rich wooden heritage. Think of this bygone episode as an epic example of an era that got away.

Continued





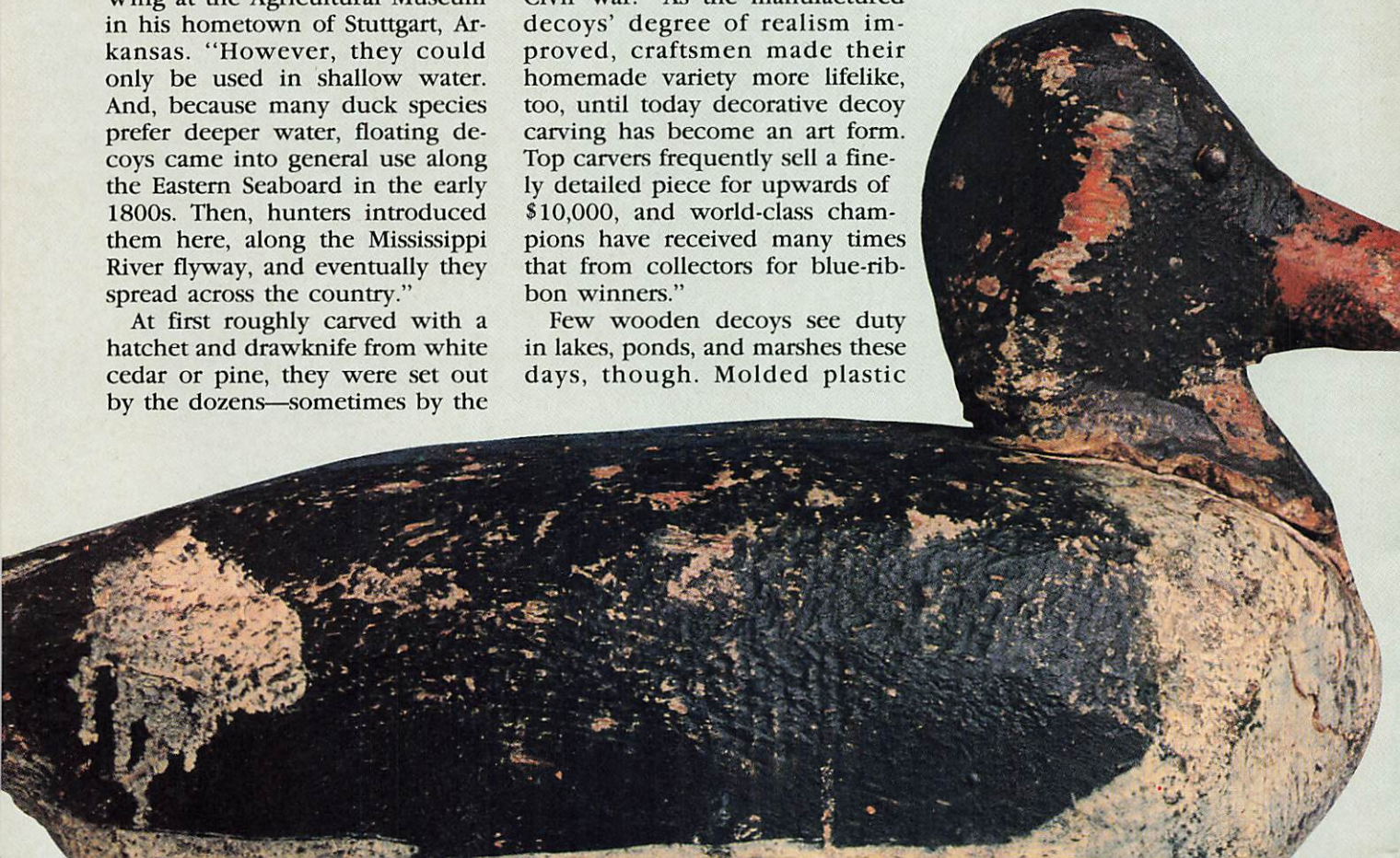
Wings once homed in on carvings

The successful wildfowl hunter sets out decoys to entice birds within shotgun range. These artificial ducks and geese—a genuinely American innovation—were first created by Indians, then perfected by early craftsmen.

"The earliest decoys were crude stickups, sawed from pine, painted, and supported by sticks," says Butch Richenbach, twice world champion duck caller and frequenter of the Waterfowler's Wing at the Agricultural Museum in his hometown of Stuttgart, Arkansas. "However, they could only be used in shallow water. And, because many duck species prefer deeper water, floating decoys came into general use along the Eastern Seaboard in the early 1800s. Then, hunters introduced them here, along the Mississippi River flyway, and eventually they spread across the country."

At first roughly carved with a hatchet and drawknife from white cedar or pine, they were set out by the dozens—sometimes by the hundreds. Hunters called them stolls, tollers, or blocks, and even though they were crude, they were durable, light, and they did the trick. The working decoy *below,* crudely carved from pine, was used to lure pintail ducks to hunters on Lake Winnebago, at Fond du Lac, Wisconsin, about 1910. According to William Koelpin, a nationally known wildlife carver, artificial decoys were first made in factories following the Civil War. "As the manufactured decoys' degree of realism improved, craftsmen made their homemade variety more lifelike, too, until today decorative decoy carving has become an art form. Top carvers frequently sell a finely detailed piece for upwards of $10,000, and world-class champions have received many times that from collectors for blue-ribbon winners."

Few wooden decoys see duty in lakes, ponds, and marshes these days, though. Molded plastic proves lighter and less expensive. Yet, many a serious wildfowler wouldn't be caught in a blind without a hand-turned and tuned call. Calls like this one, *above,* made by Arkansas' Butch Richenbach, still come in cedar, teak, Osage orange, walnut, or an exotic such as cocobolo. Priced at about $50, they hark back to the days of hand craftsmanship as well as bring in the ducks.



Izaak Walton knew his wood

At the American Museum of Fly Fishing, in Manchester, Vermont, curator Alanna Fisher looks after history, and much of it includes wood. A woodworker herself, Fisher admires the handcrafted gear from the past. Citing fishing historian Martin J. Keane (*Early Rods & Rodmakers*, The Winchester Press, 1976), she comments that 15th- and 16th-century bowyers, who knew the characteristics of wood species, probably made the earliest rods. And, they were no doubt made for royalty and the gentry, who were always looking for new diversions.

When Izaak Walton wrote *The Compleat Angler* in 1653, he described rods, and told how they should be crafted. At that time, fishing rods resembled pool cues—stout and gently tapering from handle to tip—a shape perhaps more familiar to bowyers. "Hazel, willow, and ash rods date back to the 1500s," she says, "but they were comparatively heavy. Gradually, as stronger but lighter-weight wood species were found, fishing rods, and fly rods in particular, began to be made thinner and lighter," the curator explains. "For example, greenheart and lancewood (lemonwood) from South America were discovered and fashioned into lightweight, limber rods. And, due to woods' toughness and good looks, they remained popular in Europe and the United States well into the late 1800s. In the 1930s, when split bamboo [a grass] became the favored material because it was extremely light, strong, and flexible, you could still find greenheart rods in sporting-goods catalogs."

According to the curator, the museum collection also includes some less obvious wood items. "We have examples of metal reels from the 1830s with rosewood and tulipwood handles. And, some salt-water reels made entirely of wood—walnut, mahogany, cherry, white oak. These were around into the 1940s," she notes. "Of course, there's the classic fishing creel woven of willow or split ash, and the beautifully made hand nets with a handle and frame of ash or hickory."

Outside of a museum, about all you can find now of wood in fishing is the Rapala minnow lure from Finland. For more than 40 years, it's been primarily made of balsa. But collectors still yearn for wooden plugs, like the muskie-sized Pikie Minnow shown *right*.

Species still sporting

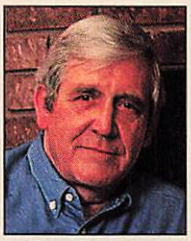
"We really haven't lost all that much of the market to plastic and other man-made materials," claims Frye of the Fine Hardwoods/American Walnut Association. "In addition to baseball bats and golf-club heads, we have hickory and ash hockey sticks, maple bowling lanes and pins—the pins are maple on the inside—maple basketball courts, wooden water and snow skis of ash or with ash cores, walnut gunstocks and pistol grips, as well as knife handles of both native and imported species." Frye also cites croquet, with mallets and balls of maple, hickory, and beech, and even items as common as pool cues. He notes that the choice ones still feature combinations of walnut and maple, set off by ebony and holly.

"It'll be a long time before sports parts company with wood, since wood has such a long historical association with all aspects," says Frye. "And, it has been a real winning tradition."

Written by
Peter J. Stephano
Photographs:
Bob Calmer
Illustrations:
Jim Stevenson

CARVE A SANTA

Georgia carver Ron Ransom says "Happy Holidays" with this country Claus



Ron Ransom

When Ron Ransom first picked up a carving knife 11 years ago, he had no idea what it would lead to. "I carved plaques in relief, then shore- and songbirds, and even tried a duck decoy or two," recalls Ron. "Then, a couple of years back, I carved a Santa for my wife, Evelyn. While I was at it, I made a few more and took them to a craft show. Holy cow, they all sold!"

Since then, the Marietta, Georgia, carver has focused on what he calls "Old World Santas." And, now he has dozens of designs.

Getting Santa started

For Ron's Santa, you'll need a piece of basswood measuring 2 × 4¾ × 7¼" and a carving knife. Transfer the outline from the pattern onto the wood and bandsaw the figure to shape. Then, begin rounding the edges.

Next, draw in the lines for the face, hands, goose, and other details on the front. (The nearly flat back has only the continuation of the coat's trim and grooves separating the arms from the body.)

Now, start making stop cuts about ⅛" deep along the lines you drew. Then, lay your blade against the wood and cut to the lines.

Avoiding a break

"My Santas don't always have roly-poly faces," Ron comments, "but the features are rounded. The challenge is avoiding a square face." For definition, cut a line at least 1/16" deep to separate the cheeks and nose from the beard.

"For each eye, just leave a rounded area of wood the size of a pinhead," Ron advises, "then highlight them later with paint. For his beard, cut a series of grooves to varying depths."

Because the grain in your figure runs vertically, the carver cautions against accidentally breaking off the goose's head. "Don't try to carve its neck round and slender," Ron says. "Leave it a little wide."

Now, add the look of ages

Ron never sands the wood, but goes right to the painting. For this Santa, Ron applied acrylic paints in black, white, flesh, red, brown, and a metallic gold.

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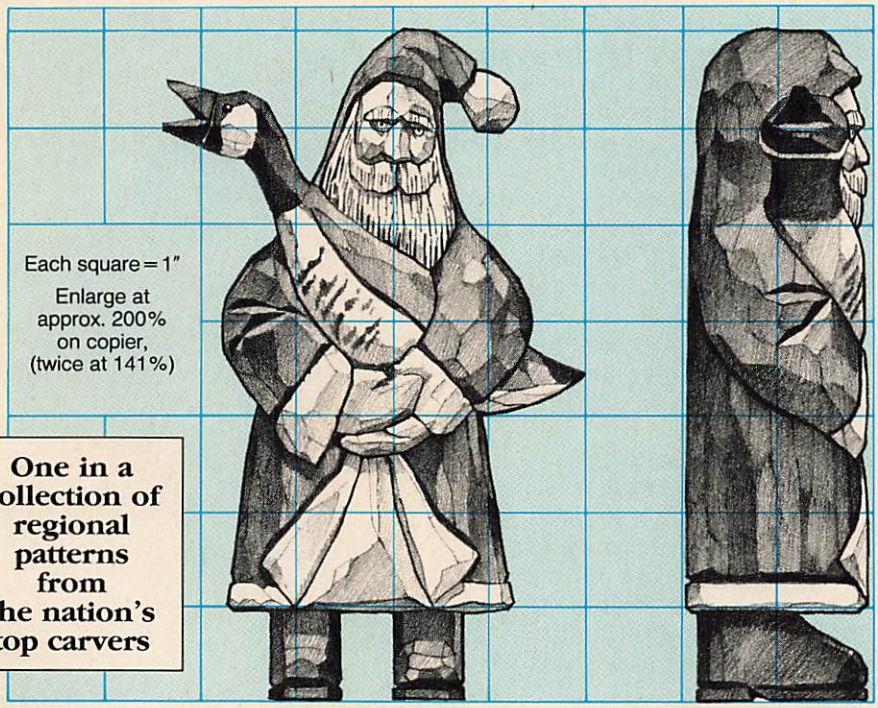

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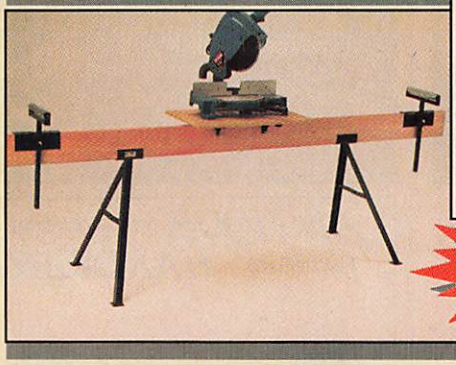

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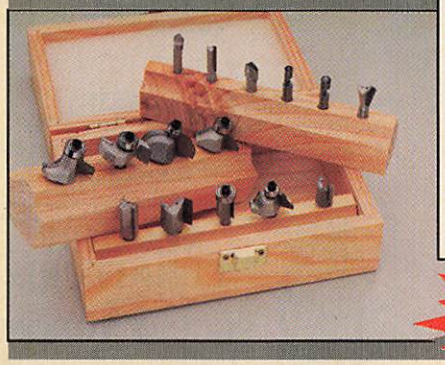

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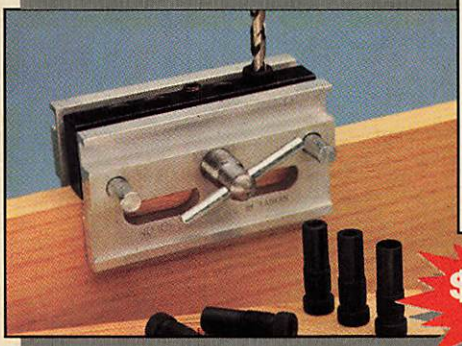

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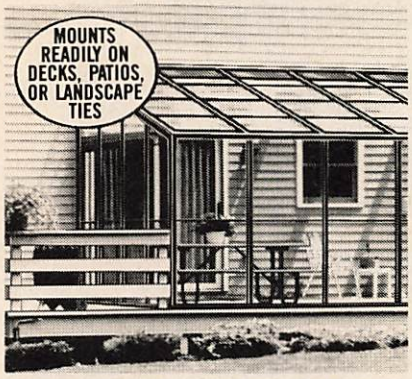

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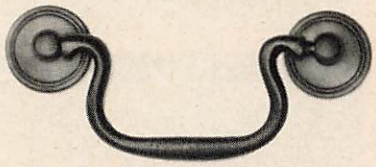

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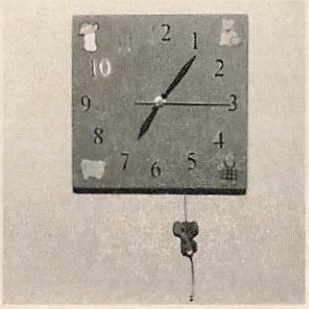

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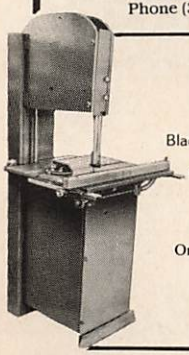

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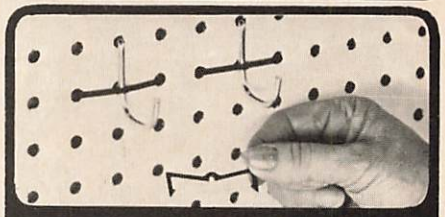

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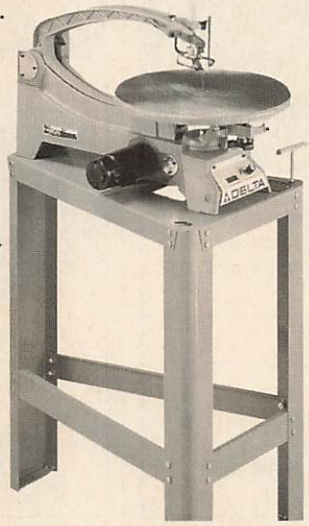

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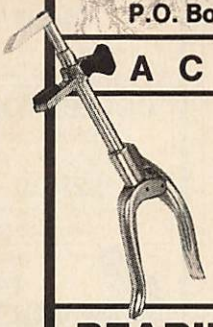

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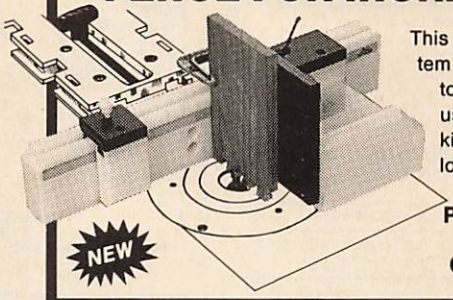

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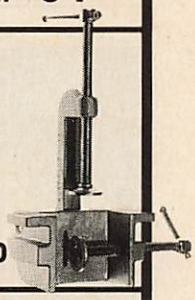

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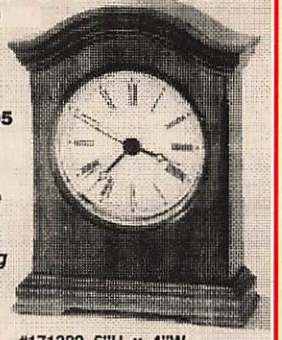

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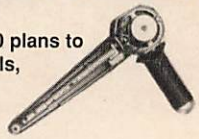

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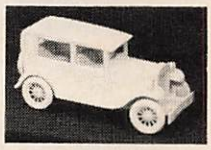

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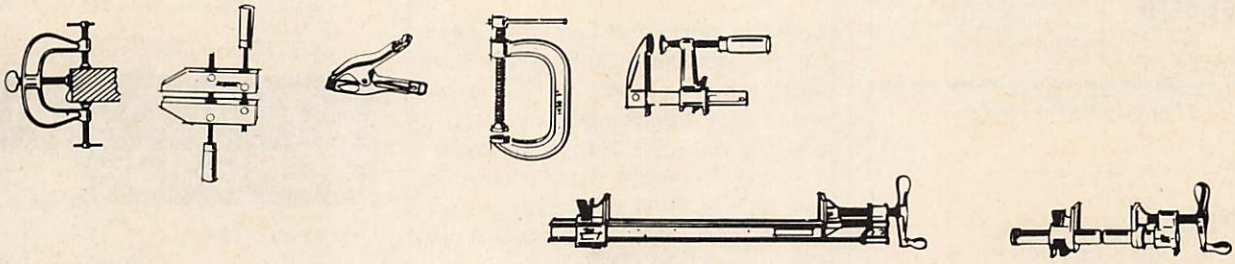

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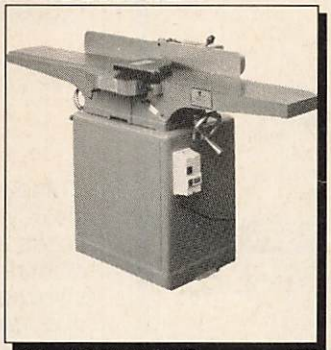

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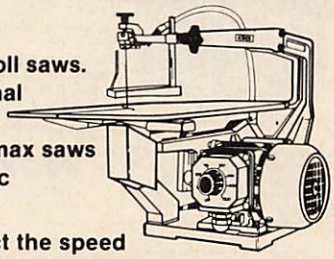

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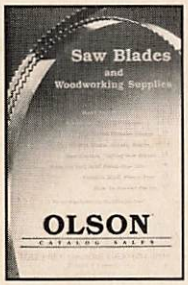

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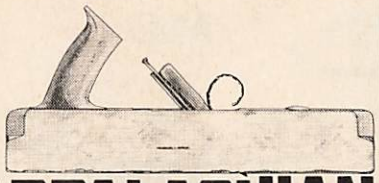

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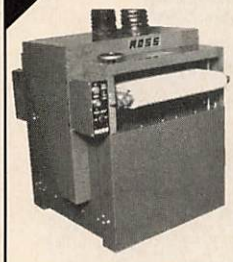

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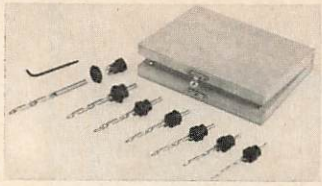

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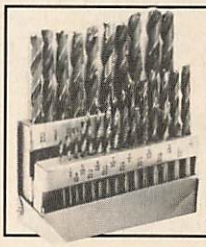

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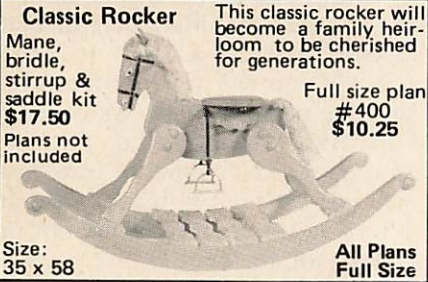

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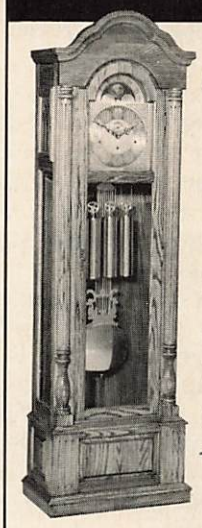

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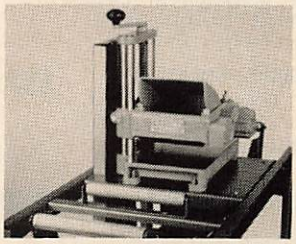

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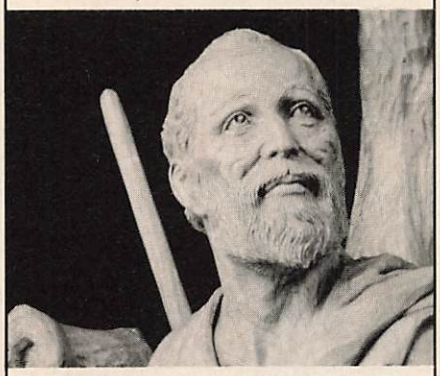
Woodcarving Art 1991 Wall Calendar



A large 11" x 25" wall calendar featuring 13 FULL COLOR and 12 Black & White photos of some of the best woodcarvings done in North America today! Includes a biography of each artist and tells where to find woodcarvings and woodcarving information. $9.95 plus $2.00 for shipping. A GREAT GIFT IDEA!

Satisfaction guaranteed!

WOODCARVING ART
P.O. Box 336C
Whitewater, WI 53190

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10" Benchtop Bandsaw **$129.95**

Upper & Lower blade guides w/ bearing wheels for maximum stability.
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SHOP SENSE

TUNE IN TO WORKSHOP CONSCIOUSNESS

Have you ever noticed that on some days everything goes perfectly when you're working in the shop? Then, at other times, you can't seem to do anything right? Here's how to avoid those not-so-good experiences, especially with the holidays coming up.

What mood you're in has a lot to do with the effectiveness and efficiency with which you accomplish things, in the woodshop as well as anywhere else. And, there's a bunch of factors that can affect your work:

• *Fatigue dulls your senses, making it difficult to concentrate or to work at peak efficiency.* If you're driven to do something, limit your activities to the uncomplicated, such as finish-sanding.

• *Emotional stress directs your mind away from the task at hand, preferring instead to dwell on what's causing it.* Focusing attention on your work becomes impossible. Some woodworking activities, such as carving, can help you wind down. Really upset? Stay out of the shop.

• *Numbed senses have no place in the shop.* Never attempt woodworking when you're under the influence of alcohol or drugs (even medicine that makes you drowsy). Anything that impedes your judgement or response time will directly affect your ability to work *and* your safety.

• *Distractions pull your attention away from tasks and procedures that require your total concentration.* That's why it's wise to post the shop "off limits" to the uninvolved. Teach children, for instance, that the shop isn't a play area. Instead, involve them in shop activities, but make certain that they follow strict safety rules. A shop isn't a kennel, either. Maintain strict control over your pets. An eager puppy underfoot could cause a nasty accident.

• *Fear of either machine or tool prevents you from operating it safely.* On the other hand, overconfidence begs for trouble, too. So, learn how to safely operate a machine, then always respect it.

How to make things go right

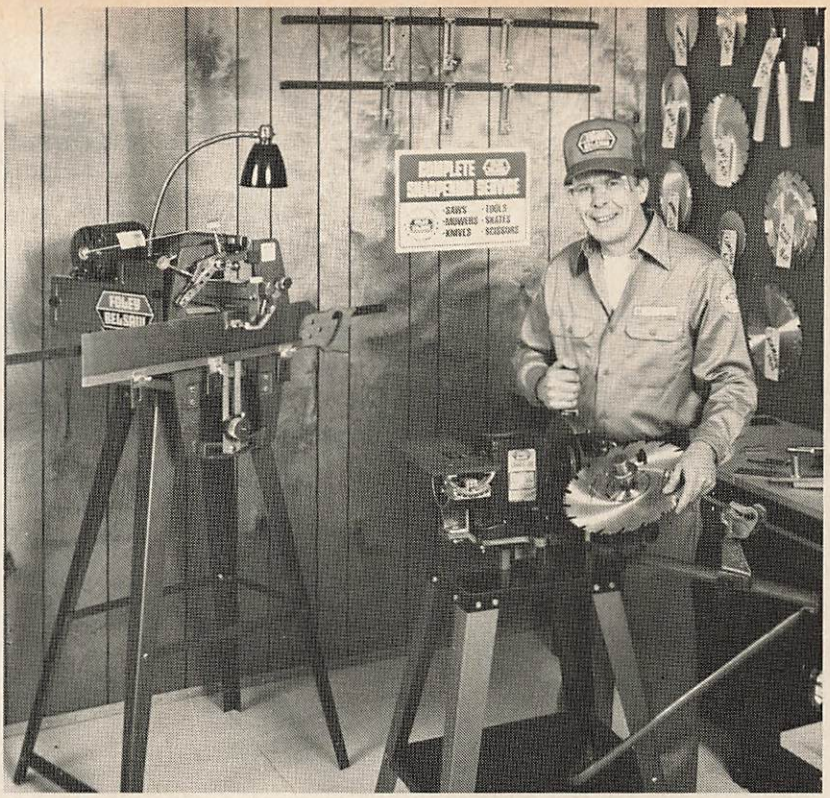
Good planning plays an important role in getting everything running smoothly in your shop. You can't help but feel frustrated if you're constantly backtracking due to forgetfulness. But, rushing a job can be equally bad.

Your work speed relates directly to your experience. For that reason, there's a limit to how quickly you can work without affecting performance. Machines, too, have their limits. For instance, there's a limit to how fast you can feed a saw blade without lowering the quality of the cut or risking an accident.

So, be sensible. Don't set unrealistic goals for what you can accomplish in one session. And, do the work in carefully thought-out stages. (Write down a plan of attack to get organized.) Then, your thoughts and actions will come together in what some woodworkers call "workshop consciousness." That's when you feel familiar tools responding, when you get a rush of exultation as a difficult joint slips together, and you have a sense of accomplishment as a project becomes reality. And, that's really what woodworking is all about.

Illustration: Jim Stevenson

Now you can have Lifetime Security in a CASH business where you can easily make up to $200.00 per day and more



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FREE ***Lifetime Security*** *Fact Kit*

Your FREE Lifetime Security Fact Kit tells you how to make $18.00 to $30.00 an hour in your own Foley-Belsaw Full-Service Saw and Tool Sharpening Business. Your FREE Fact Kit explains how you can:

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There's plenty of business where you live to keep you busy. It doesn't matter whether you live in a big city, small town or a small farm community.

You'll quickly be able to develop the skills necessary to earn a steady income. You'll be able to sharpen all types of saws, garden and shop tools for home, farm and industry.

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- ... CASH for the things you've always wanted!

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You can be like Steve Taylor of Brookville, Ohio, who told us:

"... the first year I grossed $21,000.00."

Or James B. Jones, of Albuquerque, NM who reported:

"This past summer my sales and service amounted to almost $6,000.00 a month."

But you've got to get the FACTS before you can get started. So WRITE NOW for your FREE Lifetime Security Fact Kit. It's yours to keep with NO OBLIGATION.

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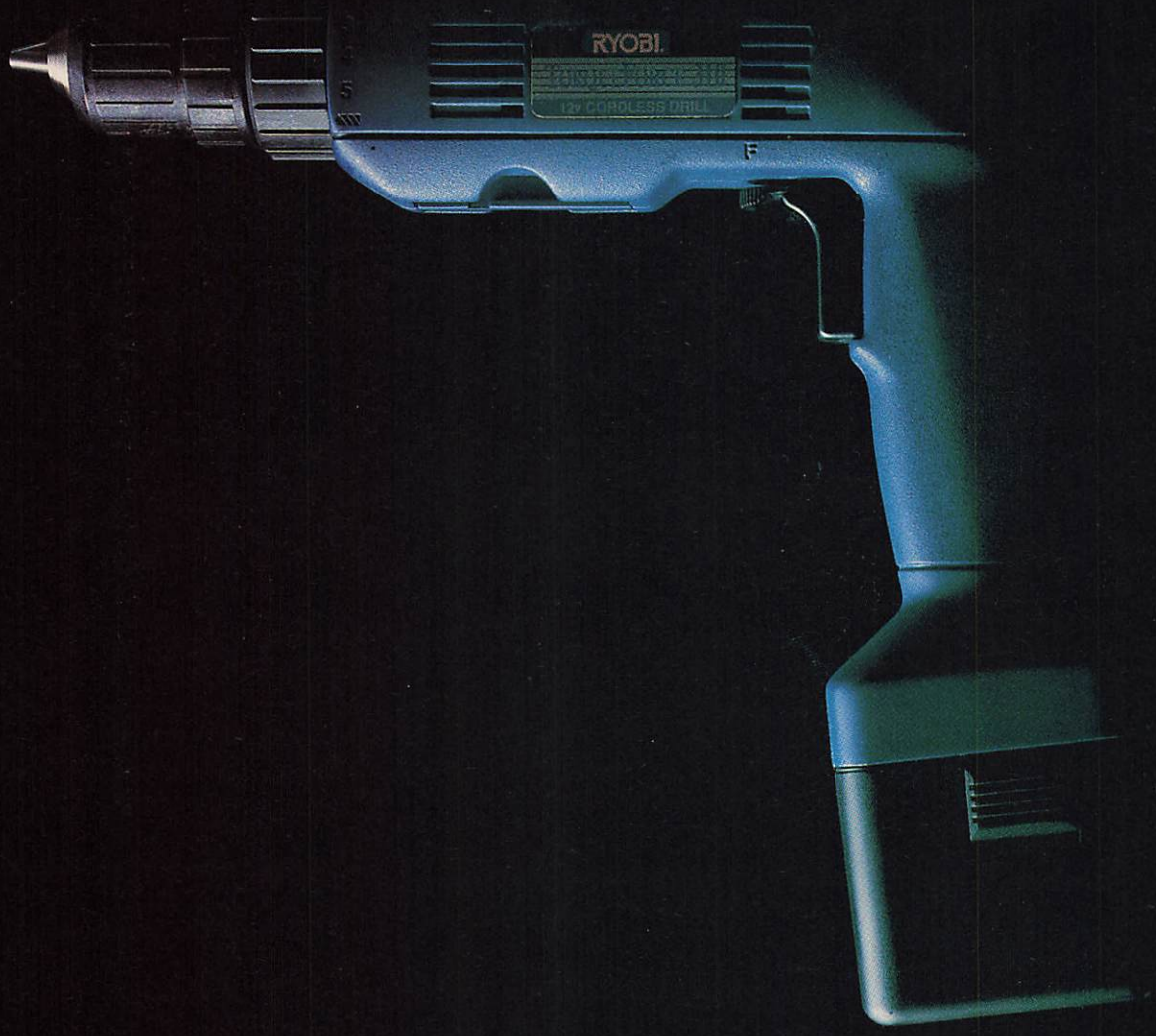

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Check the items you want, tear out this section and casually leave it where your family can find it. They'll get the hint!

☐ Sand on a cushion of air! We supply 5 free "flexible" sanding sleeves to go along with the 1½" diameter x 4" long heavy-duty sander. Chuck into your drill press or drill, (⅜" shaft incl. in drum), & quickly polish out scratches, burns, & cutting marks. $33.95 + $4.50 s&h. Catalog #01606. INDUSTRIAL ABRASIVES CO, W642 8th St., Reading, PA 19603. 800-428-2222, 800-222-2292 (PA only).

☐ Personalize your finished projects with BrandMark's solid brass, torch heated branding iron. Easy to use, lasts for years, satisfaction guaranteed. Makes an ideal gift. Custom irons available. Standard "Handcrafted By" and your name (20 letters). $23.95 plus $2.50 s/h. Electric, $44.95. Check/Visa/MC/Amex. Order from BRANDMARK by F&K, Dept. W12-0, 462 Carthage Dr., Beavercreek, OH 45385. 1-800-323-2570 or 513-426-6843.

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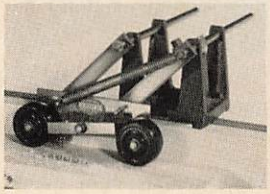
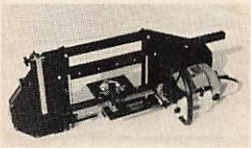
☐ Quality exotic lumber and turning wood. Most exotic species available such as rosewoods, ebony, etc. Specializing in highly decorative lumber and turning wood from Australia/Tasmania. Special Christmas gift certificates available. THE BEREA HARDWOODS CO., 125 Jacqueline Dr., Berea, OH 44017. 1-216-243-4452.



☐ If you value your fingers you need RIPSTRATE®. Holds the work tight against the fence with no hands near the blade; makes perfect cuts; wheels lock to prevent kickbacks. No adjustment needed for stock width or thickness. One year guarantee. $69 delivered. Check/M.O./Visa/MC. Free brochure. FISHER HILL PRODUCTS, 4 Fisher Hill, Fitzwilliam, NH 03447. 1-800-421-0256.

☐ For your favorite little someone, this kit features a beautiful wood case made of select solid American cherry. The quartz pendulum movement plays the famous Westminster melody on the hour, partial melody each quarter hour and counts out the hours. A brass urn provides the finishing touch to the scrolled top crown. Runs on "D" battery. Finished clock size: 24" x 8½" W x 4-⅛"D. Clock kit and matching shelf retail for $149.95. For more information about this beautiful kit, call 1-800-KLOCK-IT (that's 556-2548). Dept. WDA129.



☐ One man saw mill, weighing only 45 lbs, Ripsaw cuts 20" diameter logs any length into dimensional lumber. The narrow kerf band saw blade cuts quickly & accurately with minimum waste. Maximum cutting width of 14" with a thickness adjustment from ⅛" to 9". High performance model for only $1599. Less expensive models available. BETTER BUILT CORPORATION, 845 Woburn St., Wilmington, MA 01887, or call (508) 657-5636.

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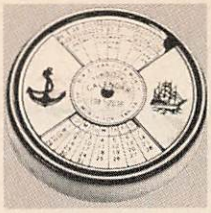
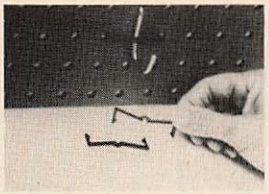
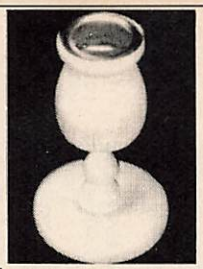
☐ Add beauty and charm to your home with Emperor's Marquis Mantel Clock. This easy to assemble kit is solid ¾' cherry and features triple chimes and beveled glass. Sale priced at $199.50. Send $1.00 for full color catalog. EMPEROR CLOCK COMPANY, Dept. 3794, Emperor Industrial Park, Fairhope, AL 36532.



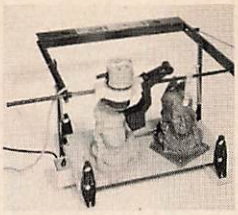
What a great gift idea! A 50-year calendar as small as a pocket watch. Made of solid brass and highly polished it will give the month and day at a glance until the year 2035. It is ideal as a paper weight too. They're inexpensive so why not order a few. $6.50 each post-paid, two for $12.00 or six for $30.00. ARMOR PRODUCTS, Box 445, East Northport, NY 11731. New York residents add tax.



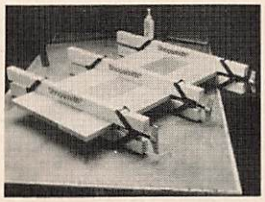
Stop pegboard hook fall-out forever! M-CLIPS are the guaranteed perfect solution to the annoying problems of pegboard hooks that come loose when a tool is removed. Fit both 1/4" and 1/8" perfboard, lock into adjacent holes and hold hooks tightly in place. Send self-addressed stamped envelope for free sample or $5.99 plus $1 p/h for package of 50 to: AETECH CORP., Dept. W, Box 6289, Lawrenceville, NJ 08648.



Holiday candle holder. Made from a wheel, spindle, candle cup and insert. Wood parts and dowels from MIDWEST DOWEL WORKS, INC., 4631 Hutchinson Rd., Cincinnati, OH 45248.



The Dupli-Carver is a wood duplicating machine that can reproduce three-dimensional carving in wood. The machine uses a stylus (tracer) to follow the contours of a statue or plaque. Two models starting at $359. WOODMIZER®, 8180 W. 10th St., Dept. QQ29, Indianapolis, IN 46214. 1-800-553-0219, IN 317-271-1542.



Level surfaces when gluing stock together using Double Bar Clamps exclusively from Shopsmith. Eliminate workpiece bowing with pressure applied to sides, top and bottom. Three sizes: 24" (555162) $33.00, 36" (555163) $37.00, 48" (555164) $40.00. SHOPSMITH, INC., Dept. AKTV, 3931 Image Drive, Dayton, OH 45414-2591. 1-800-543-7586.

Like a third hand. Provides that extra support so often needed. Its rugged, heavy-duty, all-steel construction makes it a tool you'll depend on for years. Roller is 13" long, galvanized and ball bearing. Adjusts in height from 25 3/4" to 45". When you're done it folds flat. #HPR-13, $39.95 + UPS, HTC PRODUCTS, INC. Toll free 1-800-624-2027. In MI, 313-399-6185.

Warren Tool Company's Woodcarver's Catalog features the finest quality whittling and carving hand and power tools, books, sharpening stones, wood & supplies. Remember our motto, "Warren Tools give you the edge." We sell only the finest professional tools. Send $1.00 to: WARREN TOOL CO., INC., RT. 1, Box 14A, Dept. PDW, Rhinebeck, NY 12572. 1-914-876-7817.

Create a spectacular 8 1/2" high Dentzel stander carousel horse with this complete precut kit. Send check or call toll free 1-800-284-6229 and charge it to your Visa/MC/Amex. Ask for kit #617000, $32.50 ppd. $2.00 for our 64-page color catalog featuring over 2,000 woodcarving tools, books and supplies. (Catalog free with order.) WOOD CARVERS SUPPLY, INC., P.O. Box 8928-W, Norfolk, VA 23503.

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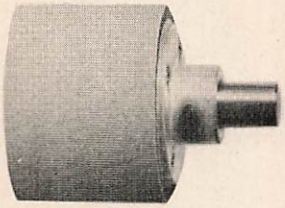
The new RBI 720 Woodplaner-Molder-Sander, power fed gang ripsaw is built to handle any of these basic woodworking functions with speed and precision. Set up is easy with RBI's patented quick change cutterhead system. Available in 8", 12" and 20" models. Proudly made in America, RBI, 1801 Vine St., Harrisonville, MO 64701. 1-800-535-8665.



Simply cut sandpaper from standard sheets for these sleeveless drum sanders. Special: 1" x 3" & 2 1/2" x 3" set, $29.95 + $2.50 s/h. Many other sizes available. Money-back guarantee. Send check to: SINGLEY SPECIALTY CO. INC., P.O. Box 5087B, Greensboro, NC 27403.

Drill Press and Radial Arm Saw Rotary Planers! Won't grab or kick back! Planes, tenons, rabbets, molding, raised panels, and decorative cuts; all with a Safe-T-Planer. Safety designed diecast unit with detailed instructions and sharpening tools for easy maintenance. Guaranteed! Moderately priced through suppliers & catalogs or contact: G.&W. TOOL, INC., P.O. Box 691464, Tulsa, OK 77169.

A great third hand. Many, many uses. Support for your table saw, extension for your jointer, hold up that piece on your planer or maybe just a saw horse. Adjusts from 22" to as tall as 48". Heavy cast iron base with sturdy chrome tubes. Call to order today. TOTAL SHOP. 1-800-845-9356. $39.95 + $6.00 shipping. Order #914.

30 lbs. of assorted hardwoods. Excellent for small crafts and toys. Random species and thicknesses. All surfaced 2 sides. 1/2" – 2" thick, 3" – 10" wide and 6" – 24" long. Shipped UPS prepaid, $29.95. STEVE H. WALL LUMBER CO., Rt. 1, Box 287, Mayodan, NC 27027. 1-800-633-4062 or 919-427-0637.

If you enjoy woodworking, a versatile Marlin Wood Carving Machine may be just what you need. Three-dimensional carving of sculptures, plaques, panels and mouldings is easy. Wood sign carving is simple. Available in three sizes. MARLIN INDUSTRIES, INC. Route 70, Box 191, Cashiers, NC 28717. 704-743-5551.

Now you can lay out precise letters and numbers for your wood craft projects. Scroll-sawers and sign carvers use these specially designed lettering layout guide sets. Quick and easy to use – simply trace around the letters – guides are very durable. Several styles and different sizes are available. Brochure $1.00. SEYCO SALES, 1414 Cranford Drive, P.O. Box 472749, Garland, TX 75047.

Edlco is offering a bundle of lumber. 10 board feet of 3/8" shorts, 3" and wider, 18" – 36" long in cherry, oak or walnut. Includes a "How To" project book and top-grade lumber catalog! Only $42.95 delivered. Specify species and send check or money order to: EDUCATIONAL LUMBER COMPANY, Box 5373 W, Asheville, NC 28813.

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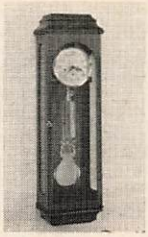
12" capacity, conveyor feed, Thickness Sander for the hobby woodworker. Delivers same precise, flat, smooth surface as our heavy industrial sanders. Complete with separate feed motor, steel stand, and main motor! Only $989.00! Financing available! ROSS INDUSTRIES INC., Box 637, Pineville, Mo. 64856. (417) 223-4031.

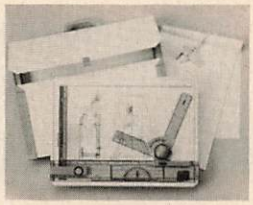
Personalize your wood items quickly and easily with this brass branding iron. First line: HAND CRAFTED BY; second line: your choice of up to 20 characters including spaces. Compact size. $26 ppd. Guaranteed. Order toll-free 1-800-826-7606 (NE residents 402-464-0511) or by mail from NOVA TOOL CO., P.O. Box 29341, Dept. BGL, Lincoln, NE 68529. Shipped within 1 week.

Moisture-related problems such as shrinking, warping and cracking can ruin the most beautiful wooden pieces built. Avoid wood moisture problems by checking the wood with a moisture meter! The pocket-size Mini Ligno moisture meter is for the serious hobbyist and professional woodworker. LIGNOMAT, P.O. Box 30125, Portland, OR 927230. Call 503-257-8957 or 800-227-2105.



Create a family treasure! Be remembered for giving elegant Spirit of Liberty Westminster chiming wall clock. Best quality West German movement. Choose rare walnut cherry or oak. Crystal clear beveled glass. Kits made by grandfather craftsmen, Excelsior MN. Catalog $2.00. Visa/MC. KUEMPEL CLOCK WORKS, 21195 Minnetonka Blvd., Excelsior, MN 55331. 1-800-328-6445.

"How-To-Video Tapes" Bandsaw, tablesaw, jointer, planer, shaper, drill press basic operations are shown in these 20 minute VHS format tapes. See your local JET distributor.



Portable drafting kit with graduated protractor, straight edge and side scales. Professional quality W. German product with durable white plastic surface takes 11x17 paper. Ideal for on-the-spot sketches and drawings. Carrying case included. $82.70 ppd. GARRETT WADE, 161 6th Ave., New York, NY 10013 or call 1-800-221-2942.

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You'll be amazed at the performance of Freud's Thin Kerf Blades. Needs less energy from under powered saws, less waste of rare and expensive woods and far less heat build up. Order now and save up to 44%. LU88 10" x 60T – $44, LU87 10" x 24T Rip – $39. WOOD PECKERS. Toll-free 1-800-752-0725.

Build a musical instrument for someone in your family this winter! We have the finest precut kits, plans, and hardware for making harps, dulcimers, lyres, banjos, mandolins, violins, and much more. Catalog $1.00. MUSICMAKER'S KITS INC, Dept B-7, 423 S. Main St, Stillwater, MN 55082. (612) 439-9120.

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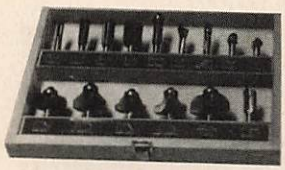
Make a gift ... don't shop the Mall – go to your shop! Our "Baby" grand piano would be welcomed by anyone on your Christmas list. Fully operating 15-note electronic keyboard! #04565Z Plans & parts kit (no lumber) $8.95, Candleabra #79005 $2.49/ea, please add $4 processing charge. 64-page catalog $2.00. CRAFTER'S MART, P.O. Box 2342, Greeley, CO 80632.

Executive Wood Toys! Now you can create this 1929 Ford van and many others like it from our detailed and easy-to-read patterns. We offer you a complete line of patterns, parts, and wheels. Make this holiday season a time to remember with our Executive Wood Toys. Send $1.00 for catalog to: TOYS AND JOYS, Box 628 GL, Lynden, WA 98264.

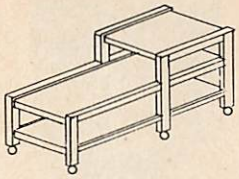


15-piece router bits set. (1/4" shank only) All high grade carbide tipped, and most popular two flute router bits are selected in this set. Best buy for the woodworking beginner, and ideal gift for the advanced woodworker. Buy one set and get a free 5 piece working set ($25.00 value), all for only $109.00. AMMAX, 12655 Danielson Court, Suite 310, Poway, CA 92064.

Tungsten carbide router bits and cutters. Large selection of the most wanted profiles. Nationally known for money saving discounts, quality tools, and fast service. Call or write now for our Christmas sale catalog. Special Christmas delivery available. SKYCROFT TOOLS, INC. P.O. Box 498GL, Myersville, MD 21773-0418. Call 1-800-767-4747. 24 Hour service.

Now anyone can set a table and radial arm saw accurate to within 10/100". Designed for both the home handyman & professional, ParaGauge provides a parallel measurement up to 18". for setting rip fences & up to 2 1/2" in blade depth. Completely portable, ParaGauge can also be used to set band saws, drill presses & router tables. Perfect gift idea. PG12 $34.95 + $3.50 s&h, PG18 $39.95 + $5.00 s&h. To order call 1-800-343-6129 or write ACCUSET TOOL CO., INC., P.O. Box 1088, Troy MI 48099. MC/Visa accepted.

There always seems to be one certain hanger which works best for each different item you need to hang. This 370-piece assortment includes 14 different hangers – 140 in all plus 230 fasteners and organizer box. Order #8403 assortment at $14.99 plus $4.95 per order p/h to MEISEL HARDWARE SPECIALTIES, P.O. Box 70GS, Mound, MN 55364.



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You can build this – easily constructed, very functional home entertainment center. Keeps VCR, stereo, T.V. in one place. Moves anywhere on casters. You will appreciate its versatility, cost. Express your creativity and show with pride! Order the plans now. $7.00 (catalog included) from J & I ENTERPRISES, 7316 Baer Rd., Ft. Wayne, IN 46809.

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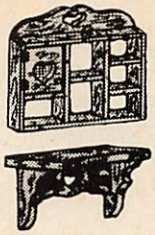
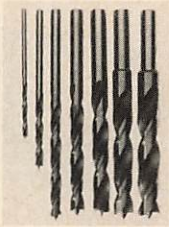
A weekend is all it takes to build a graceful Shaker table ... a space-saving chest of drawers ... a magnificent school-house clock ... and 98 other top-quality woodworking projects. The Weekend Woodworker brings you step-by-step plans, exploded illustrations and detailed materials lists to make every project easy, fast and fun! To order your copy of THE WEEKEND WOODWORKER, send $23.95 to Rodale Books, P.O. Box 8, Emmaus, PA 18098.



Make popular country shelves and shadow boxes. Great gift ideas, highly profitable sellers. Full size patterns and instructions for twenty unique designs plus our Woodcraft Pattern catalog featuring over 1000 fun, profitable projects ... only $9.50. Send to: THE WINFIELD COLLECTION, Dept. HGL, 12044 Parkin Lane, Fenton, MI 48430.

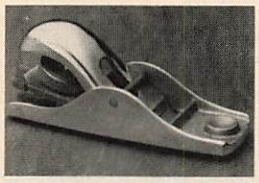
Decorate with this old-fashioned sleigh and reindeer. Built from plywood, parts just interlock. Dismantles in seconds, stores flat. Full-size patterns for cutting parts and painting. Sleigh is 36" long. Request #WD2091 ($9.95). Includes shipping. Visa/MC. CRAFT PATTERNS. 1-800-747-1429.

Free Woodworking Tool catalog! WOODCRAFT SUPPLY offers over 4,000 of the finest quality woodworking tools, books, and supplies in our complete catalog. Cabinetmakers, craftsmen, carvers, woodturners, and woodworking hobbyists have depended on Woodcraft since 1928. Free technical assistance, too. Call toll free: 1-800-542-9115, Dept. 90WI10T.

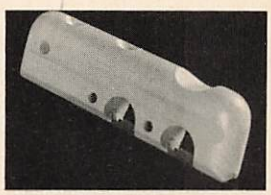


Carbide Tipped Brad Point Drills outperform High Speed and Alloy and run at faster speeds without burning bit or workpiece. Accurate and clean entry holes. 7-pc. set: 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2". #10-7777 specially priced $38.99 prepaid to you. DOLLAR TRADING CORP (WM), P.O. Box 68666, Indianapolis, IN 46268.

Give yourself a Forrest Woodworker II 40 Tooth Blade – the one blade that gives you a smooth-as-sanded surface. This single blade rips and crosscuts rock hards and soft woods splinter-free. It also cross cuts oak and birch ply-veneers with no bottom splinters. Call Keith or Anthony 1-800-733-7111. Amex/MC/Visa. FORREST MFG. CO., INC.



Any woodworker would love to own this Bronze Low Angle Block Plane. Blade comes fully sharpened and ready for use. Made in the U.S.A. by Lie-Nielsen. Only $75.00, and we pay shipping. The JAPAN WOODWORKER, 1731 Clement, Alameda CA 94501 Order toll-free: 1-800-537-7820.

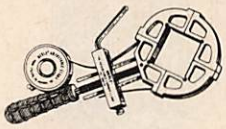


GRIZZLY's Model G1880 slickplane puts an 1/8" radius on your woodworking project. No more sanding to soften edges. Two carbide-tipped blades are micro-adjustable. Body is made from select hard maple and brass sole conforms to a 90° work edge. Only $14.95. To order call 1-800-541-5537 west of the Mississippi and 1-800-523-4777 east of the Mississippi.

CARBIDE TIPPED 1/4" SHANK ROUTER BIT SETS

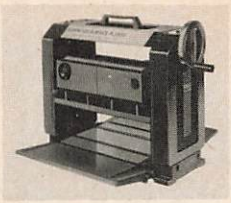
"Must Have" Carbide Tipped Router Bits Set includes most desired bits used by all woodworkers. Set makes a special gift. 8-piece set includes: 3/8" round over bit, 1/4" straight bit, 1/2" straight bit, 1/2" flush trim bit, 3/8" rabbeting bit, 45° chamfer bit, 3/8" key hole bit, and 1/2" 14° dovetail bit. Exceptional quality and value. $69.95 for set. MLCS LTD., P.O. Box 4053D, Rydal, PA 19046. Call toll free 1-800-533-9298.

Clock makers special! 3" Multi Spurred Forstner Bit makes quick work of routing opening for clock movements. 1/2" shank and spurs insure professional results. Prepaid $35.00 WOODWORKS, 4500 Anderson, Ft. Worth, TX 76117. (817) 281-4447.



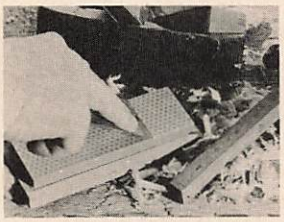
"Merle," the adjustable corner clamp, forces your project into square. Full adjustable from 2⅝" x 2⅝" to 69 x 69". Perfect for anything that requires 90 degree corner clamping. Cast aluminum and steel construction; quick and easy to use. $22.95. MLCS LTD., P.O. Box 4053D, Rydal, PA 19046 or call toll-free 1-800-533-9298. Visa/MC.

Delta 1" belt sander with flexible shaft sands, grinds, deburs, contours, sharpens, buffs and polishes almost any material. Uses standard 1"x30" abrasive belts. It features an unique power take-off for mounting a fllexible shaft with accessory attachments that perform many extra jobs like carving, drum sanding and finishing. Die-cast aluminum table tilts 45° for angle operations. 2-year limited warranty. For a dealer in your area, call DELTA INTERNATIONAL MACHINERY CORP., 800-438-2486.

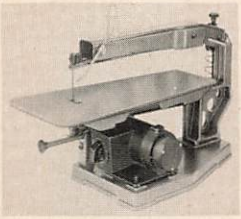


Super 125 Surface Planer from Penn State Industries. Re-surface your wood and reduce it to exactly the thickness you need with Penn State's Super 125, 12½" planer. The planer features portability at 65 lbs., high speed knives, and an auto feed mechanism. Only $359.95 (add $15 UPS shipping). PENN STATE INDUSTRIES, 2850 Comly Rd., Philadelphia, PA 19154. Credit card orders taken by phone: 1-800-288-7297.

Delta 16" 2-Speed Scroll Saw performs intricate inside curve cutting. Speeds of 850 & 1790 CS/M cut woods, metals, plastics, & compositions. 16" arm to blade & 2" depth of cut. 11¾" dia. table tilts 45° for bevel cutting. Quickset blade changing has instant-acting blade tension release lever with patented pivoting chucks & wrench. Frame & table cast-iron construction; 1/10 HP 1.6 Amp, single-phase, 115V induction motor, & fingertip blade tensioning control. 2-year limited warranty. DELTA INTERNATIONAL MACHINERY CORP., 800-438-2486.



6" Diamond Whetstone™ feature an interrupted diamond patterned surface – great for sharpening, lapping, and deburring any hard materials: steel, carbides, ceramic, glass, stone, etc. Available in 3", 4", 6", 8", & 12" models; fine, coarse, and extra-coarse diamond mesh. Contact your woodworking or hardware store or call MDT 1-800-666-4368. DIAMOND MACHINE TECHNOLOGY, INC., 85 Hayes Memorial Drive, Marlborough, MA 01752.



Variable Speed Scroll Saw from Penn State Industries. A variable speed scroll saw is a necessity for cutting metals, plastics and hardwoods where slow speeds are necessary. Penn State's new US-15 saw features infinity variable speeds from 400-1,800 cpm with full power at all speeds. Only $189.95 (add $10 UPS shipping) from PENN STATE INDUSTRIES, 2850 Comly Rd., Philadelphia, PA 19154. Credit card orders taken by phone: 1-800-288-7297.

Here's a complete antique picture frame restoration kit, including training manual and video, that shows you how to capture big profits fixing frames. Frame-Kit is great add-on business or part-time opportunity for men, women. Complete in-home, stand-alone business. Frame-Kit is just $499.95. Complete furniture restoration catalog, $2. Free workshops. MINUTEMAN, INC., Dept. 17, 115 N. Monroe, Waterloo, WI 53594. 1-800-733-1776.

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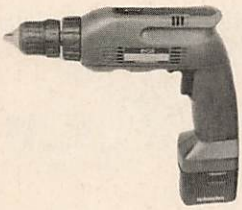
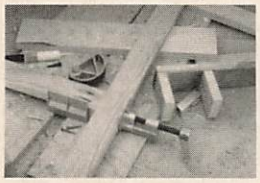


Ryobi's three new "Torque Force"™ cordless driver/drills will drive longer screws, drill holes quicker and drive more screws than any other cordless driver/drills. The ⅜" Torque Force drills are available in 7.2-volt, 9.6-volt and 12-volt models. For more information contact RYOBI at 1-800-323-5615.



Exclusive Leichtung Innovation! "Brute-Strength" Cam Clamp holds with such steady force, you can drill and nail face frames, cabinets and shelves without setting up shaky C-clamps or bulky bar clamps. Credit card, order #24844-WD (only $19.99 + $3.95 p&h.) Toll-free 1-800-321-6840. LEICHTUNG WORKSHOPS, 4944 Commerce Pkwy., Cleveland, OH 44128-5985.

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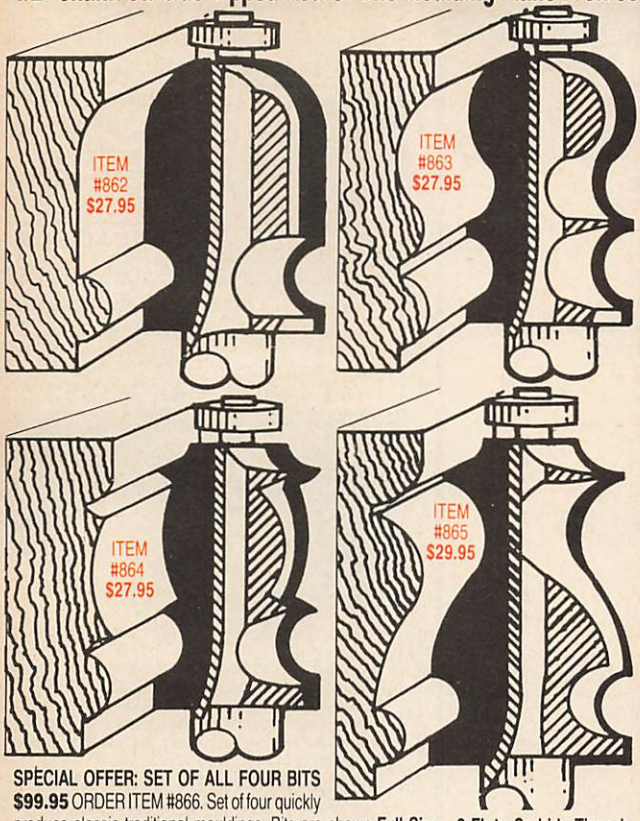

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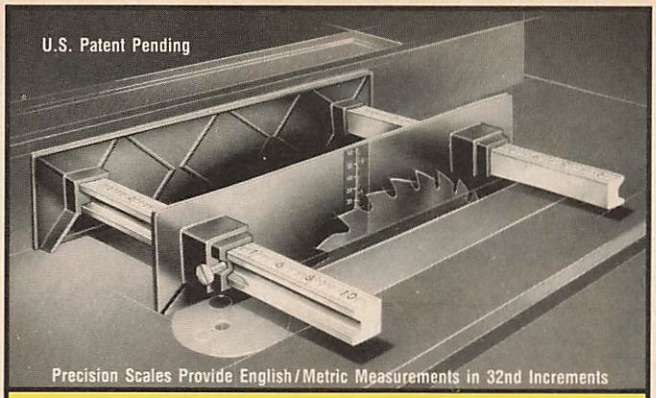

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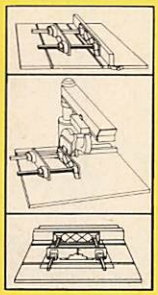

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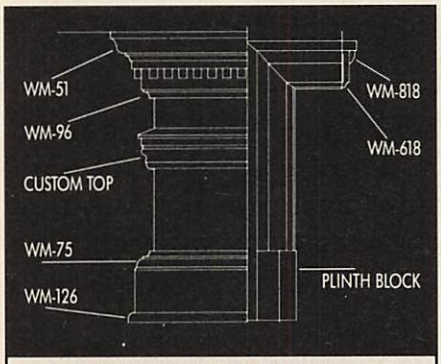

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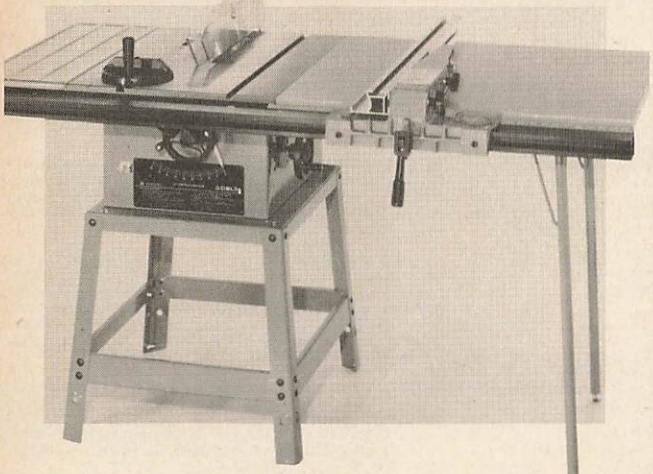

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23-680	6" bench grinder 1/4 H.P.	81	75
23-880	8" bench grinder 1/2 H.P.	136	115
11-950	8" drill press	164	139
14-040	14" drill press	313	309
40-150	15" hobby scroll saw	178	139
28-160	10" hobby band saw	189	144
31-050	1" belt sander 2.0 amp.	93	78
31-460	4" belt/disc sander	178	139
31-340	NEW1" belt/8" disc sander	226	175

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23-580	5" Bench grinder 1/5HP	60	54
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33-990	10" radial arm saw	727	569
37-280	6" motorized jointer	440	379
50-179	3/4 H.P.2 stg. dust coll.	435	339
50-180	1 H.P. dust collector	535	449
50-181	2 H.P. dust collector	760	599
22-667	13"planer w/2 HP motor. w/stand & ext. wings	1750	1099
33-050	NEW 8-1/4" Sawbuck	742	545
34-330	NEW 8-1/4"Tbl Saw 13A	321	195
34-985	1/6 H.P. stock feeder	698	579
32-100	NEW station plate joint	645	289
36-040	NEW 8-1/4 cmpd mitre	216	159
34-897	50" Delta unifence	500	338
36-755	NEW10"Tilt Arbor Saw	1203	889

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6527	NEW SawZall v/spd 8amp w/case & Quick Loc Cord	299	175
0399-1	NEW12V cdlss var/spd drill w/batt., charger & case	290	165
0395-1	9.6V cdlss. drill w/cse	270	154
0219-1	9.6V cdlss. drill w/cse	295	165
0224-1	3/8" drill 4.5A magnum	189	114
0234-1	1/2"drill 4.5Amag0-850rpm	209	114
0244-1	1/2"drill 4.5Amag0-600rpm	209	114
0222-1	3/8" drill 3.5A 0-1000 rpm	179	104
0228-1	3/8" drill 3.5A 0-1000 rpm	169	99
0375-1	3/8" close quarter drill	208	125
0379-1	1/2" close quarter drill	243	154
6539-1	Cdls. scrdrv. 190 rpm	119	75
6540-1	Cdls. scrdrv.w/bits&cse	159	108
6546-1	Cdls.scrdrv.200&400rpm	126	79
3102-1	Plmbrs rt angle drill kit	330	189
3002-1	Electricians rt angle drill	330	185
5399	1/2" D-hdle ham drill kit	312	179
1676-1	H.D. Hole Hawg w/cs	429	235
6511	2 sp SawZall w/case	224	129
6750-1	Drywall gun 0-4000 4.5A	154	95
6507	TSC SawZall w/case	239	135
6170	14" chop saw	430	259
6014	Orb.sander 1/2 sheet	209	122
8977	Var. temp heat gun	114	75
5397-1	3/8" v/sp ham. drill kit	232	137
5371-1	1/2" v/sp ham. drill kit	335	185
3107-1	1/2" v/sp rt angle drill kit	340	195
6754-1	Drywall gun 0-4000 4.5A	179	119
0230-1	3/8" drill 0-1700 rpm	189	119
3300-1	1/2"v/sp mag rt angle kt	309	179
5660	Router 1-1/2 H.P.-10A	325	195
5680	Router 2 H.P.-12A	355	225
5455	7/8" polisher 1750rpm	219	129
6215	16" chain saw	280	169
6365	7-1/4" circular saw	204	119
6366	7-1/4"circ.saw w/fnc&bld	214	125
6368	7-1/4"circ.saw w/fence blade & case	239	135
0216-1	2 sp cdls drill Hi-torque	245	139
0235-1	1/2"drill kyls. chuck mag	215	125
6016	1/4 sheet pad sander	84	49
6145	4.5" grinder 10,000 rpm	159	99
6142	6145 w/cse & access	197	125
6749-1	Drywall gun 0-2500 4.5A	189	125
6377	7-1/4" worm drive saw	295	169

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LU72M010	Gen Pur. -A.T.B.10"	40	58	38
LU82M010	Cut-off 10"	60	77	44
LU84M011	Comb. 10"	50	65	40
LU85M010	Super Cut-off 10"	80	96	55
LM72M010	Ripping 10"	24	57	37
LU73M010	Cut off 10"	60	70	44
LU87M010	Thin kerf 10"	24	60	38
LU88M010	Thin kerf 10"	60	74	44
LU98M010	Ultimate 10"	80	107	69
SD306	6" Dado - Carbide		184	105
SD308	8" Dado - Carbide		196	109
F0	1-3/4"X5/8"Bisc.1000 Qty.		32	27
F10	2-1/8"X3/4"Bisc.1000 Qty.		32	27
F20	2-3/8"X1"Bisc.1000 Qty.		34	29
FA	Assor. Biscuits 1000 Qty.		34	29
WC106	6 pc.chisel set w/cs1/4"-1"		73	52
WC110	10 pc.chisel set w/cse		119	79
FB100	16 pc. forstner bit set		284	155
FB107	7 pc. forstner bit set 1/4"-1"		82	49
94-100	5 pc router bit door system		288	155
JS100	Biscuit Jointer w/case		300	159
CE82	Planer w/case carb blds		218	135
FT2000	3-1/4 H.P. plunge router		299	185

THE NEW "TK" BLADE SERIES

Item	Description	Teeth	List	Sale
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TK206	10" Framing	24	33	19.80
TK303	7 1/4" Finishing	40	36	21.60
TK306	10" Finishing	40	40	23.95
TK903	7 1/4" Combo	30	31	18.60
TK906	10" Combo	50	45	26.95

MAKITA CORDLESS

Model		List	Sale
6070DW	3/8" v/sp rev. drill, 7.2v	130	78
6071DWK	3/8" v/sp rev. drill w/removable batt, 7.2v	199	115
5090DW	3-3/8" saw kit, 9.6v	256	139
6010DWK	3/8" cdls drill kit, 7.2v	164	95
6010SDW	3/8" cdls drill, 7.2v	99	65
DA3000DW	3/8" angle drill, 7.2v	251	139
8400DW	Hammer drill kit, 9.6v	272	149
4390DW	9.6v cdls. recip saw kit	230	128
4300DW	Jig saw kit comp., 9.6v	232	129
6012HDW	2 spd. driver drill w/clutch & cse 9.6v	236	122
6092DW	V/sp drill, kit comp	250	127
6093DW	V/sp drill w/clutch-comp.	261	129
6891DW	Drywall gun 0-1400 9.6v	237	135
632007-4	9.6 volt battery	48	30
632002-4	7.2 volt battery	40	28
5007NBA	7-1/4" saw w/elec. brake	233	129
5008NBA	8-1/4" saw w/elec. brake	284	158
BO4510	1/4 sheet pad sander	85	54
9900B	3"x21" belt sander w/bag	268	148
9924DB	3"x24" belt sander w/bag	282	149
9045N	1/2 sht fin. sand. w/bag	231	129
4200N	4-3/8" circ. saw 7.5A	225	127
4301BV	Orb. v/sp jig saw 3.5A	289	155
JR3000V	Vs. recip saw w/cse	227	129
LS1020	New 10" miter saw	463	245
9820-2	Blade sharpener	373	195
1900BW	3-3/4" planer w/cse	209	115
1911B	4-3/8" planer 7.5A	240	139
1100	3-1/4" planer w/case	401	219
9207SPC	7" sander-polisher	276	155
3601B	1-3/8 H.P. router	255	139
3700B	1/2 H.P. trimmer	190	109
9501BZ	4" grinder, 3.5 amp	126	75
BO4530	6" round sander	101	64
BO4550	1/4 sht pad sand w/bag	86	58
DA3000R	3/8" angle drill	270	148
HP2010N	3/4" v/sp hmr. drill w/cs	300	165
2708W	8-1/4" table saw	504	259
2711	10" table saw w/brake	841	489
2030N	12" planer/jointer	3120	1699
2040	15-5/8" planer	2595	1399
1805B	6-1/8" planer kit /case	679	359
5005BA	5-1/2" circular saw	223	135
6404	3/8" drill 0-2100 rpm 2A	104	65
6510LVR	3/8"drill rev. 0-1050 rpm	145	79
6013BR	1/2" drill rev. 6Amp	241	139
5402A	16" circular saw-12Amp	636	349
3612BR	3 H.P. plunge router	377	189
9401	4"x24"belt sander w/bg	318	175
3620	1-1/4 H.P.plunge router	192	109
4302C	V spd. orb. jig saw	302	159
5077B	7-1/4" Hypoid saw	252	145
LS1440	14" Miter saw	721	439
2414	14"cut-off saw AC/DC	351	199
5007NB	7-1/4" circ saw 13A	209	114
3612B	3 HP plunge rout sq/bs	377	189

SENCO AIR NAILERS

Model		List	Sale
SFN1	Finishing nailer 1"-2"	377	285
SFN2	Fin. nailer 1.5"-2.5"	571	405
SN325	Nailer 1-7/8"-3-1/4"	665	445
SN4	Gen'l purpose 2"-3-1/2"	685	479
LS2	Pinner 5/8"-1"	351	255
SKS	Stapler 5/8"-1-1/2"	351	255
LS5	Pinner 1"-1-1/2"	399	295

BOSTITCH AIR NAILERS

Model		List	Sale
N80C-1	Utility coil nailer	795	399
N80S-1	Stick nailer	795	399
T36-50	Sheath & decking stapler	595	334
N12B-1	Coil roofing nailer	795	399
N60FN-2	Finishing nailer	625	335
T31	Brad nailer	245	149
CWC100	1 HP Pancake Comp.	445	295

SKIL SIZZLERS

6850-02	NEW1/2" EMH hammer drill w/case 4 amp	255	129
3810	10" Miter saw	263	225
3810S	3810 w/60 tooth carb bld.		239
77	7-1/4" worm drive saw	230	145
2735-04	12v v/spd cordless drill complete w/cse. & 2 batt.	210	139

PANASONIC CORDLESS

EY6205B	NEW v/spd. 12 volt drill w/15 minute charger	390	219
EY6005B	12v cdls drill w/1hr chgr	315	169
EY6200B	NEW 2 spd. 12 volt drill d-hdle w/15 minute charger	350	195
EY6281B	NEW v/spd. 9.6 volt drill w/15 minute charger	350	189
EY571B	V/spd. 9.6 volt drill	239	135

LEIGH DOVETAIL JIGS
D1258R-12-List 329.00-Sale 255.00
D1258R-24-List 399.00-Sale 295.00
LEIGH INSTRUCTIONAL VIDEO-SALE 29.00!!

MMT	12" multiple mort. & tenon attachment for D1258-12	269	219
MMT	24" multiple mort. & tenon attachment for D1258-24	299	239

HITACHI TOOLS

Model		List	Sale
TR8	Plunge router, 1-1/2 H.P.	219	119
M12V	NEW 3H.P. v/sp router	437	239
TR12	Plunge router, 3 H.P.	354	178
C10FA	10" dlxe. mitre saw	490	275
C12FA	NEW12" mitre saw	586	339
C8FB	8-1/2" slide cmpd saw	859	469
FREUD LU91M008	8.5"c/bld 48 tooth	58	49
C15FB	15" miter saw	745	385
FREUD LU85M015	15"c/bld 108 tooth	181	115

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DELTA TOOLS

34-444 Table Saw Complete w/1-1/2 H.P. motor & stand 619.00

34-445–34-444 Table Saw complete w/30"Unifence 799.00

37-154 DJ15 6" Jointer w/ 3/4 H.P. motor 1029.00

28-28314" Band Saw w/enclosed stand 3/4 H.P. motor 689.00

70-200 NEW 20" Drill Press 729.00

17-900 16-1/2" Floor Drill Press 385.00

40-601 18" Scroll Saw w/stand and blades 689.00

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DELTA #34-080 10" MITER BOX XTRA SPECIAL 199.00 List 289.00

PIRANHA By Black & Decker CARBIDE TOOTH SAW BLADE

Model #	Dia.	#Teeth	List	Sale
73-716	6-1/2	18	13.70	7.35
73-717	7-1/4	18	13.90	7.99
73-737	7-1/4	24	17.20	9.29
73-757	7-1/4	40	31.30	16.79
73-759	8-1/4	40	44.65	24.99
73-719	8-1/4	22	19.65	11.95
73-715	5-1/2	16	13.70	7.99
73-740	10	32	33.20	15.95
73-770	10	60	61.46	29.95
73-711	10	50	65.08	29.95

HOLIDAY KIT SPECIALS

6012HDWH	Makita cdls 2/sp drill kit w/ clutch Includes extra battery &holster	288	155
6092DWH	Makita cdls v/sp drill kit w/brake. Includes extra battery & holster	305	159
6093DWH	Makita cdls v/sp drill kit w/clutch & brake. Inclds extra batt & holster	313	165
9850K	Porter Cable cdls var/spd drill kit Includes extra battery	288	165
7334K	Porter Cable 5" random orbit sander w/case &1 roll 100X &150X discs	253	149
7335K	Porter Cable 5" v/sp rand orb sander w/case &1 roll 100X&150X discs	273	159
7336K	Porter Cable 6" v/sp rand orb sander w/case & 1 roll 100X&150X discs	278	165
555K	Porter Cable plate biscuit jointer w/case &1000 assort. biscuits	339	189
JS100K	Freud plate biscuit jointer w/case & 1000 assort. biscuits	351	184
1581VSK	Bosch top hdle jig saw with case & 30 Bosch blades	305	185
1582VSK	Bosch CLIC barrell grip jig saw w/case & 30 Bosch blades	305	185
34-080K	Delta 10" Mitre saw w/Freud LU85M010 80 tooth carb. blade	409	249
Freud Trio of 10" Carb. blades: LM72M010, LU84M011 & LU85M010		232	125

PONY SPRING CLAMPS

Model	Size	List	Sale	Lots of 25
3201HT	1"	2.25	1.35	31.99
3202HT	2"	3.39	1.85	43.95
3203HT	3"	6.45	4.04	89.00

JORGENSEN STEEL I-BAR CLAMPS

Model	Size	List	Sale
7224	24"	27.11	17.55
7236	36"	29.10	18.65
7248	48"	31.96	19.75
7260	60"	35.60	23.55
7272	72"	37.30	25.29

ADJUSTABLE HANDSCREWS BY JORGENSEN

Item#	Jaw Length	Open Cap	List	Sale	Box of 6
#3/0	6"	3"	15.57	8.89	49.98
#2/0	7"	3-1/2"	16.74	9.95	53.55
#0	8"	4-1/2"	18.63	11.95	62.95
#1	10"	6"	21.30	12.99	71.49
#2	12"	8-1/2"	24.45	15.95	81.89
#3	14"	10"	31.01	18.95	104.95
#4	16"	12"	40.30	24.89	146.85

STYLE 37 2-1/2" Throat 1/4"x3/4" JORGENSEN

Item#	Jaw Length	List	Sale	Box of 6
3706	6"	9.30	6.29	35.65
3712	12"	10.30	6.79	38.59
3718	18"	11.37	7.35	41.69
3724	24"	12.42	7.99	45.25
3730	30"	13.85	9.05	51.19
3736	36"	15.15	9.95	56.65

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
50	3/4" black pipe clamps	13.10	7.89	83.99
52	1/2" black pipe clamps	10.93	6.30	68.25

BOSCH

Model		List	Sale
1581VS	Top hdle. jig saw	239	133
1582VSC	NEW CLIC Barrell jig saw	245	133
	Bosch metal case for above jig saws	34	30
	Bosch blade assortment for jig saws 30 of Bosch's best selling blades		25.99
1942	Heat gun 650°-900°	99	75
1272D	3"x24" belt sander w/bag	299	175
1273D	4"x24" belt sander w/bag	315	182
1290D	1/2 sheet sander w/bag	209	129
11-212VSR	Bulldog 3/4"SDS rtry.drill	339	195
1198VSR	1/2" v/sp hammer drill	229	135
1608	5.6A lam trimmer	140	89
1608L	Same/above w/trim gd	145	92
1609	5.6A offset base trimmer	205	122
1609K	Lam installers kit w/1609	295	169
1601	1 HP Router	165	105
1602	1-1/2 HP Router	199	125
1603	1/2 HP D hndl router	223	139
1604	1-3/4 HP 2 hdle router	219	122
1604K	Same/above w/cs&acc.	269	166
1606	1-3/4 HP D hdle. Router	243	149
3258	3-1/4" planer w/blde grd	210	129
3270D	3"x21"belt sand.w/bag	225	135
1273DVS	V/sp 4x24 belt sander	339	189
1611	3 H.P. plunge router	349	205
1611EVS	3 H.P. V/sp router	410	234
1651	7-1/4"circ.saw drop ft	179	109
1654	7-1/4"circ. saw pvt base	179	109
1632VSR	KRecip saw 8.4A orb-v/sp.	225	135
3050 VSRK	...NEW9.6V v/sp cdls.drill w/case & 2 batteries	235	135
3283DVS	NEW5" Random orbit disc sander 2.3 Amp	159	119

ELU BY BLACK & DECKER

Model		List	Sale
3338	2.25 HPv/sp plunge rout.	387	255
3304	1 HP v/sp plunge router.	261	178
3375	3-1/8"univ. planer 7.2A	280	159
3380	Biscuit jointer w/case	485	265
4024	3x21 v/sp belt sander	289	195
3303	1 H.P. plunge router	210	159
4023	3x21" belt sander 5.2A	261	185
4029	4x24" belt sander 9.2A	469	319

BLACK & DECKER

Model		List	Sale
1166	3/8"drill 0-2500rpm 4A	96	59
2600	3/8"drill 0-1200rpm 4.5A	125	85
1707	8.5"crosscut miter saw	813	449
1703	10"miter saw w/73-770 bld	313	179
3047-09	7-1/4"super saw cat w/br.	282	169
3048-09	8-1/4"super saw cat w/br.	297	185

BIESEMEYER FENCES

	50" commer. saw fence	329	285
	52" homeshop saw fence	249	229

JET TOOLS

Model	Description	List	Sale
JBS-14MW	14" band saw 1 HP	482	375
JTS-10	10" tbl saw w/std1.5 HP	554	449
JTS-12	12" tbl saw w/std1.5 HP	630	499
JWS-18	1/2" shaper w/std1 HP	479	365
JJ-4	4" jointer, 1/2 H.P.	310	275
JJ-6	6" jointer, 3/4 H.P.	465	365
JWP12	12.5" bench plnr 2 H.P.	569	379
JWP12D	Dust chute for JWP12	45	22
JSG-6	6 x 48 belt & 12"disc sander, 1-1/2 H.P.	634	465
OR1012	10" bench drill press 1/3HP	179	139
OR1412	14" bench drill press 1/2HP	299	245
OR2501F	20-1/2" flr drill press 1HP	655	509
OR1758	17"bnch drill prs.5 HP	319	289
OR1458F	14"flr drill press 3/4 HP	369	325
OR1758F	17"flr drill press 3/4 HP	395	349

RYOBI SPECIALS

Model		List	Sale
R500	2-1/4 HP plunge router	326	155
TS25IU	10" miter saw	392	179
TS25IUS	10" miter w/acc. kit & B&D 73-770 carb bld	435	225
AP10	10" surface planer 13A.	820	358
RA200	8-1/4" radial arm saw	515	245
RE600	3 H.P. plunge router	398	215
R150K	1 HP plunge router w/cs	206	105
BE321	3x21" v/sp belt sander	259	129
JP-155	6-1/8" jointer-planer	602	309

PORTER CABLE

690	1.5 HP router 8A	225	128
691	1.5 HP router D hdle	245	137
536	1.5 HP speedmatic router	310	198
518	3 HP 5 speed router	560	338
520	3 HP 15A router	510	315
695	1.5 HP router/shaper	310	198
696	H.D. shaper table	170	119
351	3"x21"belt sand w/o bag	225	128
352	3"x21"belt sand w/bag	235	133
360	3"x24"belt sand w/bag	310	175
361	3"x24"belt sand w/o bag	290	169
362	4"x24"belt sand w/bag	325	185
363	4"x24"belt sand w/o bag	310	179
315-1	7-1/4" top hdle circ saw	195	115
9315-1	315-1 comp w/cs&carb bld.	225	129
617	7-1/4" pushhandle saw	195	115
9617	617 comp. w/cs & carb bld.	225	129
314	4-1/2" trim saw 4.5A	215	128
9548	X HD bayonet saw w/cs	290	192
9629	Recip saw v/sp 8A	235	139
9627	Recip saw 2 spd 8A	225	128
666	3/8"HD vsp drill 0-1200rpm	185	122
621	3/8"HD vsp 0-1000rpm	155	95
320	Abrasive plane 3Amp	160	109
9118	Porta plane kit 7Amp	335	185
7545	0-2500 drywall gun 5.2A	169	104
505	1/2 sheet pad sander	195	112
7511	3/8" v/sp drill 5.2Amp	185	115
7514	1/2"v/sp drill 0-750rpm	195	119
537	1.5 HP.D hdle router	325	203
7548	Top hdl jig saw 4.8A	230	129
7648	Barrel grip jig saw 4.8A	225	145
330	Speed block sand 1/4 sht	97	55
555	Plate biscuit jointer w/cs	299	165
345	6" saw boss 9Amp	170	99
9345	345 comp. w/cs&carb bld.	220	129
100	7/8 H.P. router	165	105
5009	Mortise &Tenon jig	54.95	49
5116	Omni-Jig	395	265
9647	TIGER CUB recip saw	195	119
9850	12v cordless drill w/cse.	230	135
8500	Extra 12v battery	48	35
	NEW Tools By Porter Cable!		
9637	Full v/sp recip saw 8 A	240	135
7536	2-1/2 HP 2 Hdle Router	355	205
7537	2-1/2 HP "D" Hdle Router	375	219
7538	3-1/4 HP plunge router	399	235
7399	5.6A drywall cutout unit	120	75
7310	5.6A lam trimmer	145	89
7312	5.6A offset base lam trim.	209	119
7319	5.6 A tilt base lam trimmer	165	105
97310	Lam Trim Kit w/std. Base, Tilt Base, Offset Base, Slitter Base, Guide & Cs	330	185
7334	5" random orbit sander	205	119
7335	5" Var Speed 2500-6000 rpm Random Orbit Sander	225	135
7336	6" Var Speed 2500-6000rpm Random Orbit Sander	230	139
693	1.5 H.P. plunge router	280	165
6931	Plunge router base	120	75
9505	**505 Commemorative Edition brushed steel 1/2 sheet pad sander w/oak case SUPER SPECIAL**		139

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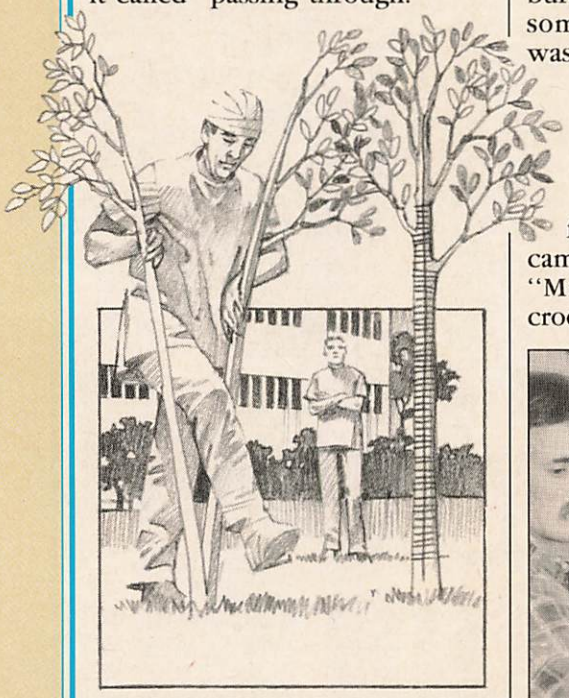
FINISHING TOUCHES

JUST PASSING THROUGH

Holly, North America's whitest wood, has high standing in folklore. Early settlers believed the tree possessed curative powers, and practiced a procedure with it called "passing through."



Healers would split a holly sapling lengthwise, then pass the patient through the opening. The sapling was then bound back together. As the young tree healed, so would the patient, at least in theory.

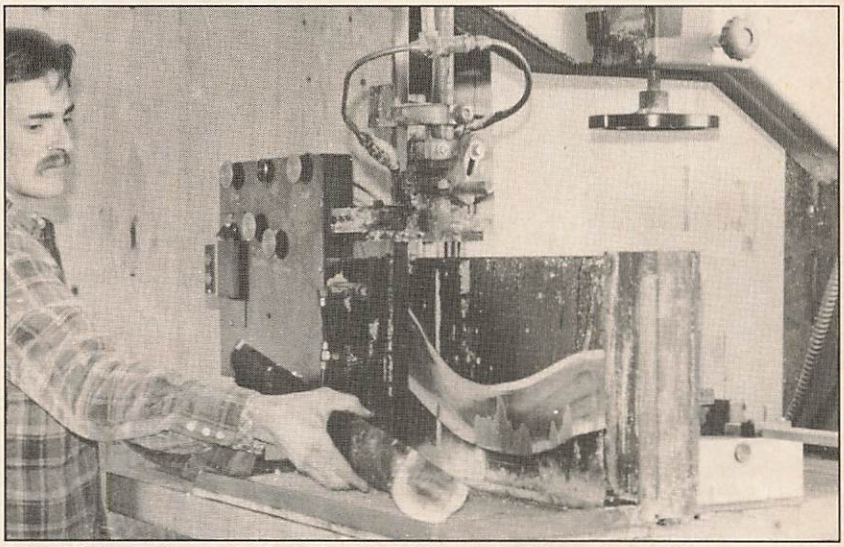
LET'S GET THIS STRAIGHT

Manzanita, usually little more than a gnarly, crooked shrub in California's arid areas, normally gets bulldozed and burned in land clearing. Only the deep-red burled root finds its way into some craftsmen's hands. That was before Ed Burton.

An inventor and environmentalist from Willits, California, Ed decided to design a machine to make this wood more usable. After a few years of tinkering, he came up with what he calls the "Microsawmill," which saws crooked limbs into flat boards.

Ed's machine gets a vise-grip on the piece of wood from the ends with strong, air-powered jaws. Then, an air cylinder pushes the bent and angular piece through the bandsaw to be cut into woodworking stock from ½" to 1½" in thickness. "Craftsmen can now make beautiful things from this wood, instead of watching it burn," says Ed, whose company focuses on ways to utilize waste.

If you want to learn more about handling manzanita, write Ed at: *EBC Company, 222 Franklin Ave., Willits, CA 95490.*



Scott White feeds crooked stock into Ed Burton's "Microsawmill."

WILD KINGDOM NO. 3

Work from wildlife carvers across the nation will again decorate Racine Festival Hall in Racine, Wisconsin, February 23–24. Last year, about 180 carvers entered the second annual Dremel/Ducks Unlimited Masters Carving Competition, and vied for $10,000 in prizes.

For information on entering and show hours, contact Dremel at 4915 21st St., Racine, WI 53406, or call 414/554-1390.

◀ Judges Larry Barth, Marcus Schultz, and Bill Koelpin rate songbirds entered in the Dremel/Ducks Unlimited Masters Carving Competition.

DON'T RUIN THE BASIL!

Try saying that the next time someone uses your favorite wood chisel as a pry bar. According to English tool historian and author R. A. Salaman, *basil* refers to a sloping edge.

UP IN SMOKE

About half the 2.8 billion trees annually harvested around the world are burned for fuel, according to the United Nations. In India, 91 percent of the wood felled ends up in the fire; in the U.S., about 22 percent.

Illustrations: Jim Stevenson
Photographs: EBC Co.; Pete Stephano

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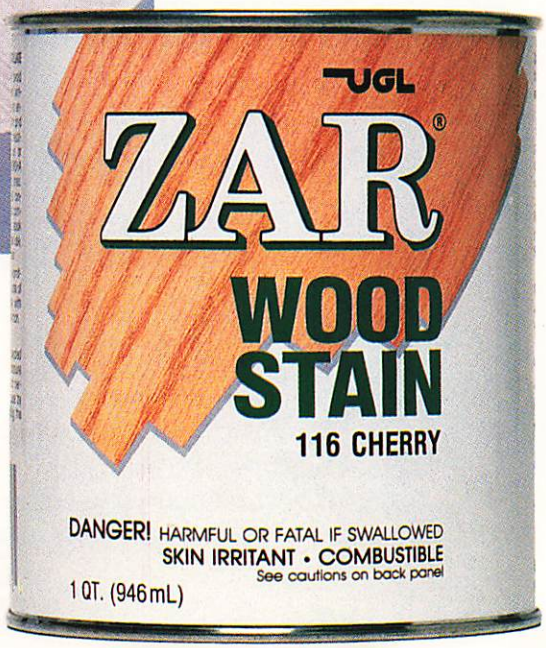
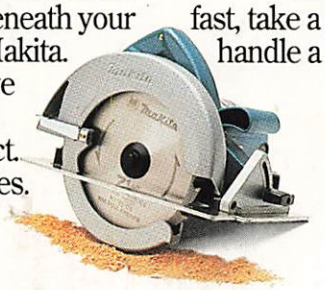


Solid Oak As Seen By A Makita Circular Saw.

Don't grit your teeth. Don't even tense your muscles. You're going to make one of the hardest hardwoods seem to melt beneath your blade. Don't worry. You're using a Makita.

Makita Circular Saws have motors that are extraordinarily powerful but exceptionally compact. They have durable, heavy-duty bases. And precision ball-bearing construction.

So if you want to eat solid oak for breakfast, take a tip from us. Get a saw that can handle a high-fiber diet.



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